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LAPARO-HYSTEROTOMY: ITS INDICATIONS AND TECHNIQUE.[1]

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We live in an age of great unrest in medical literature. Books written only yesterday are old to-day. Operations perfected and highly recommended to-day are condemned to-morrow. To recite what has been brought forward as new during the last year in any one of the departments that I am expected to represent would require more of your time than I deem prudent to occupy. I have, therefore, decided to be more in accord with the spirit than the letter of the requirements of this Society in the selection of the subject for this paper. Instead of presenting to you in a condensed form the work of others, or an account of my experience in surgery during the last year, I will call your attention to a few salient points on laparo-hysterotomy, a subject of equal interest to the surgeon, the obstetrician, and the gynecologist. The term laparo-hysterotomy signifies cutting into the uterus from the peritoneal cavity after abdominal section. In operative surgery this designation should be used to indicate an operation by which a fœtus or a tumor is removed from the interior of the uterus through an abdominal incision, followed by suturing of the visceral and abdominal wounds. The delivery of the fœtus by laparo-hysterotomy has been known since the time of Cæsar as Cæsarean section. Modern nomenclature, as far as the names of

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operations are concerned, should be established as far as possible on an anatomical basis; hence the old expresion, Cæsarean section, should give way to the more modern and accurate term laparo-hysterotomy. The same operation is also applicable in the treatment of certain forms of uterine myo-fibroma, to which, of course, the old nomenclature would have no reference.

INDICATIONS.—In obstetric practice, laparo-hysterotomy will always hold a permanent place as a legitimate procedure. Improvement in its technique, rigid observance of antiseptic precautions and careful selection of cases, will be sure to enlarge its range of application, and expand its sphere of usefulness. At no distant day it will limit laparo-hystero-oöphorectomy, or Porro's operation, to cases in which the uterus in itself constitutes a source of immediate or remote danger. It is a safer operation than Porro's. Out of 149 laparo-hysterotomies performed on the Continent of Europe, 108 mothers and 136 children were saved. Out of 80 operations in Germany, death of the mother occurred in twelve. The best results have been obtained by Schauta, 15 cases without a death; Leopold, 17 cases, with three deaths; and Zweifel 29 cases, with only one death. Porro's operation is attended by a greater mortality, and it is at the same time a mutilating procedure; and no surgeon has a moral right to add to the gravity of an operation for the purpose of preventing conception in the future. The prophylactic part of the operation is not founded on justice, and is not in accordance with modern surgical teaching, and should not be seriously considered by the conscientious practitioner unless the uterus itself is the seat of a life-threatening, removable disease. Cases have been reported in which laparo-hysterotomy was repeatedly performed with success on the same patient. In fact, I am of the opinion that a second and successive operations are fraught with less immediate danger to life than the first. The modification of Porro's operation, removal of the inverted uterus by the vagina, recommended by Francke, and strongly urged by John Bartlett, of Chicago ("A Proposed Modification of Porro's Operation," Chicago, 1886), presents no special merits in the light of modern conservative surgery, and it is to be hoped that it will be limited in the future to the removal of a diseased uterus. More important is a careful consideration of the comparative merits of laparo-hysterotomy and craniotomy. Fortunately, the opinion is gradually gaining ground that the removal of a living child by craniotomy is a relic of the barbarous age, and is being regarded, from a legal as well as a moral standpoint, as a crime. The defenceless babes in their mothers' wombs have legal rights, which let us hope will be respected more in the future than has been the case in the past. The wilful and premeditated destruction of the life of a child on its way into the world has ceased to be a justifiable procedure, and should no longer receive the sanction of the teachers of obstetrics and the pro-

fession. A resort to craniotomy should be limited to cases in which the physician can satisfy himself that the child is dead, and its removal *per vias naturales* is attended by less danger to the mother than a laparo-hysterotomy. In a very able address delivered before the Obstetrical Section of the Ninth International Medical Congress, Profesor Miller, of Chicago, clearly laid down the indications and contra-indications of craniotomy. He expressed the belief that the cases admitting of no discussion were first, when the child is dead; here, craniotomy is indicated, if the pelvic diameters are sufficient to admit of the extraction of a mutilated child without greater danger to the mother than would arise from delivery through an abdominal incision. He further stated that the second class of cases, in which the course to be pursued is clear, are those in which the antero-posterior diameter of the pelvis is less than two inches. Here the dangers to the mother, incident to craniotomy, are as great as in delivery by laparo-hysterotomy, and there is good prospect of saving the life of the child by the latter operation. In the cases in which the shortest diameter of the pelvis is three and three-fourths inches, he regards laparo-hysterotomy and craniotomy contra-indicated, and an attempt should be made to deliver the child through the normal channel without mutilation.

The statistics of mutilating vaginal operations collected by Dr. E. P. Davis, in his article in the *American System of Obstetrics*, include 1000 cases by the ablest obstetricians, show a maternal mortality of about 8 per cent. McKelway, in a paper read before the American Medical Association at its meeting in Detroit, expresses himself as follows concerning the results obtainable by laparo-hysterotomy: "I believe it fair to state that the mortality of the improved Cæsarean section, done in women not exhausted by labor, and done under proper antiseptic or aseptic precautions, by skilful operators, is not over 10 per cent." I will go one step further, and make the claim that, in well selected cases, the maternal mortality of laparo-hysterotomy is not greater than the mortality of ovariotomy in the hands of the same operators. Laparo-hysterotomy is absolutely indicated in all cases where the conjugata vera is below two and three-quarter inches, whether the child is living or dead, because the dangers incident to the mother from a craniotomy would more than overbalance the maternal risks of this operation. It is also the operation of selection when the obstruction to delivery is due to the existence of a pelvic tumor or malignant disease of the cervix. In view of these facts, it is only a just inference to conclude that in the future craniotomy should be limited to the extraction of a dead child, in cases in which this procedure does not incur more risk to the life of the mother than laparo-hysterotomy, and that in all other cases a healthy living child should be delivered without mutilation, by the natural process by the aid of forceps, turning, symphysiotomy, or by laparo-hysterotomy.

Symphysiotomy has recently again come into prominence as a formidable competitor of laparo-hysterotomy. It is certainly to the interests of the children yet unborn that this operation is being perfected, and that it has met with such a warm reception on the part of the profession here and abroad. It will add its share toward limiting craniotomy to its legitimate sphere. Its value as a life-saving measure to the child, its dangers as an operation to the mother, must be established by future experience. I fear, however, that many children will be sacrificed by substituting this operation for laparo-hysterotomy in many cases of contracted pelves. I am also confident that the permanent damage done to the mother is much greater than we have been led to believe by the enthusiastic reports recently published. Time and experience are important factors in determining the safety and value of any operation. It is difficult for me to conceive how the mechanical obstacles to delivery are to be overcome by this operation in any case in which the child is of normal size and the narrowest diameter of the pelvis is less than three inches.

Schauta (*Internat. klinische Rundschau*, 1893, 10) made experiments on the pelvis of the cadaver of a woman, and found the following increase in the diameters with five centimeters of separation of the pubic bones: Conj. vera, + 1 c.m.; trans. maj., + 2.1 c.m.; trans. ant., + 2.8 c.m.; transverse (outlet), + 3.5 c.m.; straight (outlet), + 0.3 c.m.

With the knowledge thus obtained he made three successful symphysiotomies in cases of contracted pelves.

According to the experiments of Kilian, the utmost extent to which the conjugate diameter can be increased by symphysiotomy amounts to only 1.3 c.m. In some cases, also, the sacro-iliac synchondroses are so firmly fixed that no justifiable amount of force would affect separation to a sufficient extent to be of any value in overcoming pelvic contraction. Injury to the sacro-iliac synchondroses, vesico-vaginal fistulæ, incontinence of urine, an uncertain tottering gait, prolapse of the uterus, phlegmonous inflammation, caries or necrosis of the pubic bone, are some of the immediate and remote consequences to the mother which may follow this operation. I am, therefore, inclined to believe that this operation, which has sprung into such prominence in so short a time, will be limited to its proper sphere in the near future, and will be resorted to as a life-saving measure to both mother and child in cases in which there is only a slight disproportion between the size of the child and the pelvis. It is, of course, strictly contra-indicated in all cases in which the obstacle to a normal delivery is a pelvic tumor or malignant disease of the uterus. A somewhat unusual indication for laparo-hysterotomy is the removal of certain tumors of the uterus. Enucleation of subserous myo-fibromata of the uterus through an incision in the abdominal wall is an established and well recognized operation. This operation, however, is not applicable in cases in which the tumor is located so near

the mucous membrane that by its removal by enucleation the uterine cavity is opened. The class of cases in which I wish to recommend laparo-hysterotomy is when the tumor is single, large, and projects into the uterine cavity or cervical canal, in other words, isolated, submucous myo-fibroma not adapted for removal through the vagina. I shall further on report a case of this kind successfully operated on by this method.

TECHNIQUE.

I shall forego the tedious task of describing the different methods which have been devised to effect delivery through the supra-pubic route. I will content myself in giving you a description of the method of operating which I adopted in the two cases which came under my own observation, and which will be recorded in this paper.

Time of Operation.—Authorities, with few exceptions, are agreed upon this point. The consensus of opinion of nearly all modern writers on obstetrics is to the effect that the best results concerning both mother and child are obtained when the operation is performed during labor. The danger from hemorrhage and septic infection is greatly diminished by firm uterine contractions. Coe (*Medical News*, October 8, 1892), of New York, pleads in favor of elective laparo-hysterotomy, and claims that the results are as good as when the operation is postponed until labor has commenced. If the operation is done during labor it should never be delayed unnecessarily, and should not be performed as a last resort, but as soon as it can be determined that it is necessary. Exhaustion, resulting from protracted ineffectual labor pains, greatly adds to the immediate risks of the operation and increases the liability to septic infection. The greatest difficulties encountered in the selection of the proper time are, of course, met with in primiparæ. The attending physician must often rely on his own judgment in deciding upon the propriety of the operation. In cases in which labor does not progress satisfactorily, the capacity of the pelvis should be determined by a careful examination. If this shows that a living child cannot be born, a prompt decision should be made, assistance summoned, and the necessary preparations made. In multiparæ, the previous history is of much importance. If one or more children have been previously delivered by craniotomy, it is more than probable that a laparo-hysterotomy will become necessary.

Preparations.—In all cases in which it can be ascertained beforehand that a laparo-hysterotomy should be done, the patient should be advised to enter a hospital several days before the expected labor, and if this is impracticable she should be brought to some place within easy reach of her attendant. Laxatives and warm baths are important preparatory measures. The room, bed, clothing, etc., must be properly attended to

in making the preparations for the operation. The field of operation, hands of operator and assistants, instruments, sutures and ligatures must be rendered aseptic by strict attention to antiseptic details. Very few instruments are required. A scalpel, half a dozen hæmostatic forceps, scissors, needles, and a piece of aseptic rubber-tubing, half an inch in diameter and about two feet in length, will be all that the surgeon will need. For suturing the uterine incision a small darning needle answers an excellent purpose. Catgut, silk, and silkworm-gut, and a number of aseptic towels and napkins should be at hand. After all the antiseptic precautions have been carried out, nothing but sterilized warm water will be required during the operation. Chloroform should be used as an anæsthetic in preference to ether.

External Incision.—The external incision is made in the median line, commencing at a point just below the umbilicus. It should only be large enough to permit the passage of the child without tearing. It need not exceed six inches in length. The abdominal wall in the linea alba in pregnant women at the end of gestation is exceedingly thin, often not much thicker than a piece of ordinary blotting paper. It has not infrequently happened that the operator not only cut through the entire thickness of the abdominal wall in making the first incision, but at the same time wounded unintentionally the uterus. The first incision should only divide the skin and superficial fascia, and the remaining structures should be lifted away from the uterus and divided between two dissecting forceps, after which the incision is enlarged by cutting between two fingers.

Uterine Incision.—The pregnant uterus pushes before it the intestines and omentum as it ascends from the pelvis; hence, after opening the peritoneal cavity the only thing that can be seen is the anterior wall of the uterus. The uterine incision should be made in such place and in such a manner as to limit the hemorrhage to a minimum. The uterine vessels are smallest and least numerous in the median line and away from the cervix. The opening in the uterus should, therefore, be made in the median line, half-way between the cornua, and should not extend any farther in the direction of the cervix than is absolutely necessary. Statistics show that twenty years ago Cæsarean section performed by horned animals yielded better results than those done by physicians. (Harris.)

It is a well-known fact in surgery that lacerated wounds bleed much less profusely than incised wounds. I am inclined to believe that the difference in the mortality attending the unskilful and skilful Cæsarean sections was largely due to the difference in the amount of blood lost and character of the wound; in the former the opening in the uterus was made by tearing, in the latter it was made by a clean cut with a sharp knife. Sudden loss of blood makes a more profound impression

than if the same amount of blood is lost gradually. The large uterine sinuses when divided by a sharp instrument do not retract, consequently spontaneous arrest of hemorrhage occurs slowly or not at all, but when the sinuses are torn the lumina are blocked at least in part by torn lacerated tissue, a condition which favors the formation of a thrombus upon which depends the spontaneous arrest of bleeding.

Murdoch Cameron ("The Prevention of Hemorrhage in Cæsarean Section," *British Medical Journal*, December 24, 1892) has recently introduced the use of a pessary for compressing the uterus at this stage, and this enables the operator, he claims, to cut down upon the membranes without puncturing them. I do not believe that this or any other kind of hæmostatic device is necessary before the delivery of the child, as the amount of blood lost during the time required in making the uterine incision and extraction of the child does not exceed that attending an ordinary delivery, provided the uterine opening is made quickly, and by tearing in place of cutting. The uterus should not only be in the middle line, but an examination should be made to ascertain that it is not twisted on its axis. Should this be the case the malposition should be corrected before the visceral wound is made. The median line of the anterior uterine wall can be ascertained by observing the location of the Fallopian tubes. If these occupy the same relative position, a point halfway between them will correspond to the abdominal incision. In order to limit the hemorrhage to a minimum without any artificial hæmostatic agent, I make an incision in the median line of the uterus about six inches in length, cutting down to but not into the large vessels. This incision should terminate two inches or more above the cervix. An assistant now makes pressure on each side of the abdomen in such a manner as to retract the margins of the abdominal incision, and bringing at the same time the uterus well forward into the external incision. The lateral pressure prevents the escape of blood and amniotic fluid into the abdominal cavity. With one cut of the scalpel a button-hole is now made in the centre of the superficial incision, which penetrates the entire thickness of the uterine wall and without any reference to the location of the placenta. Both index fingers are inserted into this opening, which is then enlarged to the requisite size by tearing. The superficial incised wound determines the direction of the lacerated wound. The tear in the deeper tissues may take place somewhat obliquely, but this is not detrimental either in the delivery of the child or the suturing of the wound. Only a few seconds are required in making the opening in the uterus.

Extraction of the Child.—As soon as the opening in the uterus is made the operator plunges the right hand into the uterus and quickly grasps one or both feet and delivers the child as speedily as possible by traction, while the assistant keeps up lateral pressure. The hemorrhage is greatly

diminished, or nearly arrested, as soon as the surface of the wound is compressed by the body of the child. As little time as possible should, therefore, be lost from the moment the uterine incision is commenced until this stage of the delivery is reached. The uterine incision and delivery of the child can be completed in less than a minute.

Elastic Constriction.—I cannot deprecate too strongly preliminary elastic constriction of the uterus. The time occupied in the application of the elastic constrictor and the rough handling of the abdominal contents cannot fail in adding an increased risk to the operation and endangering the life of the child, while as a blood-saving procedure it is certainly unnecessary. Elastic constriction has been charged with causing post-partum hemorrhage by Veit, Doléris, Pajot, Zweifel, Sänger, and Lusk. We must, therefore, admit that while its use may prevent bleeding during the early stage of the operation, it is apt to be followed by increased hemorrhage after its removal. This objection holds good when it is resorted to before the delivery of the child. Its employment after this has been accomplished is attended by benefit. At this stage of the operation no time should be lost in attempts to remove the placenta. If the placenta is implanted over the incision it should be dealt with in the same way as in the delivery of the child in cases of placenta prævia. As soon as the child is delivered the uterus should be brought out of the abdominal incision and constricted with a rubber tube the size of the little finger at a point below the visceral incision. Instead of tying the ligature, it is better to cross it; after making the constriction firm enough, clamp it at this point with a pair of hæmostatic forceps. Prior to making the constriction the uterus should be firmly compressed, so as to empty it as far as possible of venous blood. After the constrictor has been applied, the abdominal wound behind and above the uterus should be covered with a large aseptic compress wrung out of hot sterilized water. This prevents the entrance of blood into the abdominal cavity during the further steps of the operation, and also guards against the escape of the intestines.

Removal of the Placenta.—At this stage of the operation the placenta will be found partially or completely detached, and should be removed *in toto* with the membranes. If the placenta is adherent, it is separated at the margin nearest the wound, when complete detachment is effected by inserting the tips of the four fingers of one hand between it and the uterus. Fragments of membranes are looked for and removed. The interior of the uterus is then cleansed and lightly dusted with iodoform for the purpose of preventing putrefaction of the blood, which accumulates after suturing of the uterine wound. During this part of the operation it is important to secure uterine contraction by rubbing, and, if necessary, by douching with hot water. Should these measures fail

the introduction of a piece of ice into the uterine cavity may bring about the desired response.

Suturing of the Uterine Wound.—This constitutes the most important and prolonged part of the operation. The suturing must be done in a manner that will secure such accurate approximation of the incised and torn surfaces as to arrest bleeding by pressure, and at the same time separate perfectly the uterine from the peritoneal cavity. Only round needles should be used, a small darning needle for the large and an ordinary sewing needle for the fine sutures. I use four rows of sutures, three of catgut and one of silk. The first row is made of medium-sized catgut sutures, half an inch apart, and including the entire thickness of the uterine wall with the exception of the peritoneum. This row of sutures is intended to bring and hold in contact the surfaces of the wound, and should, therefore, include considerable tissue on each side. After the sutures have been tied there will be found a little gaping between them; this is overcome by applying a continued suture of fine catgut, which should bring in accurate contact everything else except the peritoneum. The next step in suturing is to bring in contact a strip of the serous surfaces, about one-third of an inch in width the entire length of the wound, by a third row of sutures. This row of sutures is intended to invert the serous margin of the wound on each side to the depth of at least one-third of an inch. A small darning needle and medium-sized braided silk are used in applying these sutures. The sutures are made to include the peritoneum and considerable of the muscular tissue, so as to insure a firm hold. The needle is entered about one-third of an inch from the margin of the wound, and is made to emerge a few lines from the edge, when it is made to enter at a corresponding point on the opposite side, and is brought out one-third of an inch from the margin of the wound. Two sutures to the inch will answer the purpose. The third row of sutures is buried by a continued suture of fine catgut, which includes only the peritoneum and subserous connective tissue. If all of the sutures are properly inserted and tied they can be relied upon in preventing hemorrhage after the removal of the constrictor, even in cases in which the uterus does not contract firmly. The constrictor is now removed and contractions of the uterus secured before the organ is replaced into the abdominal cavity.

Inertia of Uterus.—If the uterus does not contract promptly the organ is stimulated by rubbing, kneading, compression, hot douches, and, if need be, by the faradic current.

Subcutaneous administration of ergot may also be called into requisition. Irrigation of the abdominal cavity is not necessary. Blood and amniotic fluid, both of which being aseptic fluids, are removed by sponging. As soon as the uterus contracts it is returned into the

abdominal cavity, and if it can be done the omentum should be drawn over the line of suturing.

Suturing of Abdominal Incision.—Owing to the thinness of the abdominal wall great care must be exercised in closing the external incision in order to prevent later the formation of a ventral hernia. This remote complication occurred in one of my cases. I am now inclined to advise in such cases Edebohls' method of suturing. This consists of a row of subcutaneous sutures of silkworm-gut which include everything but the skin, and are buried by a second row of superficial sutures. Silkworm-gut is not absorbed, but as it gives rise to but little irritation it readily becomes encysted. The dressing and after-treatment are the same as in cœliotomy for abdominal tumors.

I will report in brief the two cases of laparo-hysterotomy in parturient women that have come under my own care.

CASE I.—Patient, twenty-four years of age, German parentage, born in this country. First child delivered by version and craniotomy two years before her second pregnancy. The attending physicians made a careful examination of the pelvis and found it flattened and contracted to such an extent that they gave it as their opinion that she could never be delivered of a mature living child through the normal passage. The delivery was followed by thrombo-phlebitis and septic infection, which nearly proved fatal, and only yielded to thorough intra-uterine antiseptic irrigations. When she became pregnant the second time, her attending physician, Dr. Wenzel, advised her to enter the Milwaukee Hospital a few days before the expected labor, for the purpose of making the necessary preparations for a laparo-hysterotomy. This advice was eagerly accepted. Labor commenced 6.30 Christmas morning, 1890. The labor pains were regular and strong. The membranes ruptured at 8 A.M. As, in spite of frequent and violent expulsive pains, the head had not entered the pelvis at 11 A.M., the operation was performed in the manner described above. The record states that the child was outside of the uterus in one minute after the operation commenced, and in ten minutes later the patient was put to bed. The hemorrhage was profuse for a moment, but was arrested by the pressure of the body of the child. The placenta was attached near to the uterine wound, and was removed without difficulty. A large piece of membrane was removed separately. During the suturing of the wound the hemorrhage was controlled completely by the elastic constrictor. The child weighed ten and a half pounds. With the exception of a slight post-partum temperature the mother made a good recovery. Abdominal incision healed by primary intention. Mother and child living and in good health at the present time.

CASE II.—Woman, twenty-eight years old, native of Munich, where she resided until one year ago. Married four years. First became pregnant three years ago. After being in labor for two days a forceps delivery was attempted, but failed. An assistant of Professor Winckel was called in, who performed craniotomy. He informed the patient at that time that in the event she should become pregnant again, premature labor should be induced not beyond the thirtieth week, as the pelvis was not sufficiently large to permit the delivery of a full-grown living child.

Soon after coming to Chicago she became pregnant a second time, and allowed gestation to progress to full term. She was attended by Dr. Broell, attending obstetrician to St. Joseph's Hospital, who, upon examination, corroborated the statement previously made to her, that the pelvic capacity was such as to render the passage of the child impossible without resort to a mutilating operation on the child. She had been in labor for fifteen hours when she was admitted into St. Joseph's Hospital, October 1, 1892. Although the labor pains had been regular and strong, the head had not entered the pelvis. The patient was prepared at once for the operation. The abdominal wall in the middle line was exceedingly thin. The operation was performed very quickly, the patient being under the influence of chloroform, and a large living child delivered. The placenta was nearly separated as soon as the uterus was brought out from the abdominal incision. The uterus contracted firmly immediately after the delivery of the child. The uterus was constricted below the wound as soon as it was brought out of the abdomen, and the amount of blood lost during the entire operation did not exceed that of a normal delivery. The patient never had an ache or pain, and left the hospital in less than three weeks after the operation. Mother and child remain well at the present time.

REMARKS.—In both of these cases hemorrhage was completely arrested by the sutures. No oozing occurred from the needle punctures, as in both instances the last row of sutures was made with fine catgut and an ordinary sewing needle. All of the sutures are absorbed except those of the third row, which become encysted between the uterine and peritoneal cavities. It is advisable to use as many absorbable sutures as possible, but for the third row a material should be used which can be relied upon in maintaining approximation between the inverted serous surfaces for a sufficient length of time. My experience with these two cases has satisfied me that laparo-hysterotomy can be done on the parturient woman with as small a maternal mortality as now attends ovariotomy, and that unless the uterus itself is the seat of a removable life-threatening disease a hysterectomy is absolutely contra-indicated. The time is at hand when gynecologists must, in consonance with modern surgical teachings and practice, mitigate the *furor operativus* and resort more and more to conservative instead of mutilating operations. The generative organs of the female should constitute no exception to the golden rule, never to sacrifice an organ unless it is the seat of an otherwise incurable disease.

Laparo-hysterotomy for the Removal of Uterine Myo-fibroma.—I have already alluded to a form of myo-fibroma as another indication for laparo-hysterotomy. The removal of the uterine appendages and hysterectomy in the treatment of myo-fibroma are mutilating operations, and should be reserved for cases in which there is no other alternative. I wish to speak in this connection of laparo-hysterotomy as a valuable surgical resource in the treatment of myo-fibroma of considerable size in young women, located within or near the uterine cavity. I will premise

my remarks by the report of a case that has recently come under my observation.

CASE III.—The patient was a married woman, thirty-eight years of age, who had borne three children, the youngest being eight years of age. She dates her illness back seven years, but was not aware of its nature until recently. For the last six years menstruation has been profuse, and at times painful. She was admitted into St. Joseph's Hospital November 23, 1892, and the operation was performed a week later. Patient was somewhat anæmic, otherwise her health was not impaired. On examination a hard, smooth tumor was found in the lower part of the abdomen, reaching upward as far as the umbilicus. Vaginal examination revealed a condition which very much resembled the first stage of labor. The os uteri was found high up, widely dilated, and occupied by a smooth, hard tumor, which might have been very easily mistaken for a fœtal head. Bi-manual examination satisfied me that the tumor was intra-uterine and single. Owing to the high position of the uterus and size of the tumor, I regarded a vaginal operation as uncertain and dangerous. I determined, if possible, to save the uterus and appendages, and to remove the tumor by laparo-hysterotomy. On opening the abdomen it was found that the tumor occupied the lower left and posterior part of the uterus. I incised the uterus in the median line from a point a little below the cornua to within two inches of the cervix. I had to cut through nearly the entire thickness of the muscular wall before the tumor was reached. The bleeding was moderate and was readily controlled by the use of hæmostatic forceps. As soon as the tumor was reached the work of enucleation commenced. At a number of points I had to cut strong bands of connective tissue, which seemed to extend from the uterus into the substance of the tumor. When the lower part of the tumor was reached it was discovered that on the side toward the uterine cavity, at a point a little above the cervix, the enucleated part was covered by a patch of mucous membrane. Considerable hemorrhage attended and followed the enucleation, which was arrested by packing with a long strip of iodoform gauze. A uterine sound was now introduced from below, and the mucous membrane of the uterine cavity incised upon it the whole length of the bed of the tumor, and the end of the gauze tampon brought down into the vagina. The uterine incision was closed in the manner described before, and the sutures arrested the hemorrhage completely. The abdominal incision was closed in the usual manner. The tumor weighed four pounds. Not a single unfavorable symptom followed the operation. On the fifth day the tampon was removed, the vagina irrigated with a weak solution of corrosive sublimate, and loosely packed with iodoform gauze, which was allowed to remain three or four days.

The patient left the hospital at the end of the fourth week, and has remained in excellent health since. Menstruation has been normal in frequency and quantity since the operation.

It appears to me that in such cases laparo-hysterotomy is the ideal operation, and should take the place of oöphorectomy, hysterectomy, and vaginal removal by *morcellement*. In the non-pregnant uterus the tissues are much firmer and less vascular, and the incision has to be made almost exclusively with the knife. The knife should be laid aside as

soon as the tumor is reached, when enucleation is effected with the fingers, curved, blunt-pointed scissors, or a Kocher's director. The hemorrhage from the bed of the tumor can be controlled best by the antiseptic tampon, which must extend into the vagina, serving at the same time the useful purpose of an efficient capillary drain. The mucous membrane was incised the whole length of the bed of the tumor for the purpose of securing free drainage and to facilitate the removal of the tampon. The hemorrhage from the uterine incision can be readily arrested by suturing.

I beg to submit for further consideration the following

CONCLUSIONS.

1. Laparo-hysterotomy is justifiable when delivery through the normal passage is impossible without mutilation of the living child.

2. It is absolutely indicated where the conjugata vera is less than two and a half inches, when obstruction is due to fixed pelvic tumors and advanced malignant disease of the cervix.

3. Mutilating operations on a living child for the purpose of effecting delivery are no longer legitimate obstetric procedures, as laparo-hysterotomy and symphysiotomy are life-saving operations for both mother and child.

4. Hysterectomy after laparo-hysterotomy is only justifiable if the uterus itself is the seat of a life-threatening removable disease.

5. Elastic constriction as a hæmostatic measure should not be resorted to in laparo-hysterotomy before the delivery of the child.

6. The uterine incision should be enlarged to the requisite extent by tearing for the purpose of diminishing hemorrhage.

7. The visceral wound should be closed by four rows of sutures applied in such a manner as to absolutely arrest the hemorrhage and completely separate the uterine from the peritoneal cavity.

8. Laparo-hysterotomy is also indicated in the operative treatment of single, large myo-fibroma of the uterus in young women when the tumor is located within or near the uterine cavity.

9. In such cases the uterine incision should be closed in the same manner as in operations on the pregnant uterus, and the bed of the tumor should be packed with iodoform gauze, which is brought through the cervix into the vagina, thus serving the double purpose as a hæmostatic tampon and capillary drain.

HYSTERICAL TREMOR AND HYSTERICAL ANOREXIA (ANOREXIA NERVOSA) OF A SEVERE TYPE.

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The history of hysterical tremor is brief. The literature of hysteria, says one of the latest writers, presents an almost complete poverty concerning tremor. Another speaks of tremor as a "frequent accident, and too little studied, of the grand neurosis." Charcot, in a recent lecture, refers pointedly to the neglect in literature of this symptom, "which seems, nevertheless, destined, in proportion as it is more studied, to have a more extensive development." Gilles de la Tourette, whose recent treatise on hysteria represents the French school, says that among the permanent stigmata there is none whose history is more recent than that of hysterical tremor. Moreover, the literature is almost exclusively French. When we have enumerated a few papers, and these by French authors, we have practically surveyed the field.

The writers whose names are especially identified with this subject are Rendu,[1] Pitres,[2] and Dutil.[3] Before them a few scattered references, and the reports of a few isolated cases, are found. These, beginning with a distinct reference to tremor by Charles Lepois (Carolus Piso) in 1618, are collected and analyzed by Dutil, who is closely followed by Gilles de la Tourette. Briquet, in his classical work on hysteria, makes but a brief allusion to tremor; he attributes it to the emotions, and says erroneously that it is always a passing symptom. Homolle's case,[4] as recent as 1879, was about the earliest reported. It occurred in a woman who had other hysterical stigmata. It was a rhythmical tremor, and came after a convulsion. Chambard[5] reported in 1881 a typical case, in which the first attack occurred at eight years of age; it was caused by a fright, and was at first limited to the arm, but later involved the leg. Perret,[6] ten years later, recorded a case of tremor in a girl aged eleven years. He calls it very rare in children. It began also after a fright. Perret says that this important subject is not mentioned in special treatises on the diseases of children—a statement which is easily confirmed. His patient

[1] Note sur le Tremblement Hystérique et ses Variétés. Bull. et Mém. de la Soc. Méd. des Hôp. de Paris, tom. vi., 1889.

[2] Des Tremblements Hystériques. Le Progrès Méd., 14 et 21 Sept., 1889.

[3] Contribution à l'Etude clinique des Tremblements Hystériques. Nouv. Iconog. de la Salpêtrière, tom. iii., 1890, p 27.

[4] Hémianæsthésie Hystérique Anomale, avec contracture et tremblement du membre inférieur. Le Prog. Méd., 5 Juillet, 1879, p. 517.

[5] Hémichorée et Hémi-Tremblement Hystériques. L'Encéphale, 1881, p. 114.

[6] Tremblement Hystérique chez les Enfants. Abstract in Journ. de Méd. et Chirurg. prat., 1891, p. 669.

had interesting stigmata for her age, such as modifications of general sensibility, hysterogenous zones and points, over the ovary for instance; and concentric narrowing of the visual fields with monocular polyopia. The tremor was most marked in the arms; it was present during repose, but it was much exaggerated by voluntary movement. During repose it resembled the tremor of alcoholism or of Basedow's disease. Ormerod,[1] in 1887, presented a case to the Medical Society of London. The patient was a woman, aged twenty-nine, a widow. She had a tremor of the hands, and tonic contractures of the flexors of the fingers and toes. The tremor developed after a fit (a common cause according to Dutil), and had existed for more than six months. It had somewhat the appearance of paralysis agitans. Commenting on this case, Hughlings Jackson wisely said that rhythmical tremors without obvious cause are often hysterical.

Outside of France, the best description of the tremor of hysteria has been given by Mitchell.[2] He speaks of the importance of the diagnosis of tremor, "when a spinal malady is painted on a background of hysteria." He describes a case, evidently of pseudo-sclerosis like Westphal's (to be referred to later). The patient had defect in color-vision and other stigmata. The tremor was "intentional," and simulated closely the tremor of insular sclerosis, to which disease the observer was inclined to ascribe it. The patient could not thread a needle, nor feed herself, nor carry a tumbler of water to her mouth without violent agitation, but the tremor was absent during repose. In his original lectures, Charcot made but an incidental mention of tremor in hysteria.[3]

To Rendu and to Pitres, whose distinct but almost contemporaneous essays appeared in 1888, belong the credit of having first presented this subject in a systematic way. Rendu showed that there are several types of hysterical tremor, and that they simulate especially insular sclerosis on the one hand and paralysis agitans on the other. Pitres also emphasized the fact that hysterical tremor may present wholly dissimilar forms; that it may be localized or general, permanent or intermittent, slow or rapid, and, what is definitive, that it is not always a homogeneous or identical tremor, but that it presents various types, all, however, dependent upon the same primordial cause. This latter feature, so in harmony with the protean character of hysteria, is, as we shall see later, of special significance, from the standpoint of diagnosis.

The most complete study of the subject is the thesis of Dutil,[4] who gives in detail the natural history, classification and diagnosis of this

[1] Brit. Med. Journ , December, 1887, p. 1216.

[2] Lectures on Diseases of the Nervous System, especially in Women. Philadelphia, 1885, p. 114.

[3] Leçons sur les Mal. du Syst. Nerv., tom. iii., p. 212. Paris, 1887.

[4] Contribution a l'Etude clinique des Tremblements Hystériques. Paris, 1891. Printed also in the Nouv. Iconographie de la Salpêtrière, 1 et 2, 1890; 2 et 3, 1891.

symptom. He is followed by Gilles de la Tourette,[1] who devotes large space to the subject in his recent exhaustive treatise, and again by Charcot,[2] who, in a clinical lecture, emphasizes and illustrates the importance of this study. It is thus seen with what interest the French neurologists regard the tremors of hysteria, and with what thoroughness they have described them.

I intend in this paper to emphasize the importance of the study of hysterical tremors by a review of the data for a differential diagnosis of them from tremors due to organic disease, and to further illustrate the subject by the report of a rare and interesting case. But first it will be necessary to state briefly their causes and clinical features.

CAUSES.—These tremors are sometimes gradual, but they are more often sudden in their onset. There are three chief causes: trauma, fright or moral shock, and convulsion. The tremors to which trauma directly gives origin begin now to be ascribed to their true predisposing cause, hysteria. "It is certain," says Pitres, "that most of the tremors which surgeons have described as reflex belong to the grand family of hystero-traumatic accidents." This subject has special significance in these days of "traumatic neuroses" and railway spines, which have received such a development at the hands of Oppenheim, and some German writers especially. However much we may incline to ascribe to French writers exaggerated views of the rôle of hysteria, it is certain that we must hesitate to follow on the witness stand some of our American and English experts, until they at least endeavor more faithfully than in the past to eliminate the diagnosis of hysteria. Any mere physiologico-anatomical explanation of the mechanism of tremor following trauma, falls to the ground in the failure of its author to eliminate all possible hysterical stigmata. It is not enough to ignore them; they must be proved not to exist.

Fright or moral shock is a not infrequent cause of tremor. Both Chambard and Perrot's cases in children occurred after a fright. I referred directly to this subject in a paper written some years ago,[3] calling attention to tremor as a possible effect of great fear, anger, or kindred passion; and quoted Darwin's[4] opinion that in the lower animals, as in the felines and serpents, so much nerve-force is liberated in some excited states of the brain, that muscular action, such as vibrations and other rhythmical motions, are inevitable.

Convulsion is the most common cause of hysterical tremor as observed in France. It preceded the onset of the tremor in Ormerod's case. Sometimes the tremor comes without apparent cause.

[1] Traité clinique et therapeutique de l'Hystérie, etc. Paris, 1891.
[2] Des Tremblements Hystériques. Clinique des Mal. du Syst. Nerv., 1892, p. 46.
[3] Hysteria: A Study in Psychology. Journ. of Nerv. and Mental Dis., vol. x., No. 4, October, 1883.
[4] Expression of the Emotions in Animals.

CLINICAL FEATURES.—Hysterical tremor may be partial or general. It may be limited to one arm; or it may be of the hemiplegic or paraplegic type; or it may be general, involving even the trunk and neck-muscles. When hemiplegic it has been transferred, in some cases, from one side to the other, under the influence of magnets and other hypnotic agents. When paraplegic, it resembles closely the so-called "spinal epilepsy" of Brown-Séquard, especially if accompanied with contractures.

The duration varies. Some cases persist for months, even years; sometimes the tremor comes in accesses after convulsions, lasting then for some moments, hours, or days. It should always be looked for at such times; as it is not apt to be by most practitioners, who dismiss hysteria, when they recognize it, with contempt. Its very long duration is attested by more than one observer. Gilles de la Tourette, as we have said, places it among the permanent stigmata of hysteria—an important decision, because this permanence, more than any other feature, causes it to resemble organic disease. His position is confirmed by the undoubted tendency of tremor to recurrence. In my case it existed in a most aggravated form for many months.

The intensity varies. Sometimes it is very slight; but, again, it may be so great as to interfere with walking, with writing, with the patient feeding him- or herself, and, in fact, with almost every voluntary motion. Commonly, the tremor is increased by voluntary motion; but it may persist during repose.

These tremors have a rhythm; but the rapidity and extent of the oscillations vary in different cases. Hence they are polymorphous, and, as the French insist, admit of classification. My own original observation rather confirms these teachings, to the extent at least that in this one case the rhythm was constant, *i. e.*, always presented a definite "type," as noted by the rate of the tremor on the tracings (*q. v.*). I have been led, however, by studying the very few papers extant to think that all cases do not present this constancy of type; that some cases, in fact, vary in type, *i. e.*, in the frequency and excursion of the rhythm. Hence it would be difficult to admit of a classification of *constant types;* we may, however, admit of a classification if we recognize fully that the various types may occur in the *same* patient at different times. But this is not what I understand the French observers to mean; their claim seems rather to be that one patient presents one type, another presents another. The tendency of French clinicians in all fields, as we know, is to make clinical types and to classify. On the other hand, it is rather the characteristic of hysterical symptoms to be variable, or inconstant, and tremor, probably, does not depart from this rule.

Mitchell[1] says of hysterical tremor, that it may begin as fine in rhythm,

[1] Op. cit.

and increase under excitement, or the sense of being watched, into a coarser, wider rhythm. Perret makes a similar observation on his case: during repose the tremor resembled that of alcoholism or Basedow's disease, but its amplitude was much increased on voluntary motion. If persistency of type is always found in the same patient it adds to the difficulty of diagnosis, whereas variation of type in the same patient would be more in accord with the protean nature of the disease, and would make it easier of recognition.

Several schemes of classification have been proposed. Rendu made two divisions: first, those tremors simulating insular sclerosis; and, second, those simulating paralysis agitans. Dutil divides these tremors according to the oscillations per second. He makes three groups:

1. Oscillations rapid or vibratory (8–12 per second).
2. Medium rhythm (5½–7½ per second).
3. Oscillations slow (4–5½ per second).

Among the last two groups some tremors appear only on voluntary motion; others, although existing during repose, are augmented by voluntary motion. Dutil thinks it convenient to group these apart as "intentional" tremors.

Charcot insists upon the varieties of hysterical tremors. It is an error, he says, to consider this tremor as a unit; there are a certain number of distinct types. He follows Dutil's classification almost exactly, and claims that every variety of non-hysterical tremor has its "sosie," or twin, in hysteria proper.

The variety usually recognized as the "type Rendu" is probably the most common, and the most important from the clinical standpoint. In it the tremor may, or may not, persist during repose, but it is exaggrated or provoked by intentional movements, the vibrations not being increased in frequency but only in amplitude. This type was presented by my own case, as well as by a number of those reported by others. In my patient the movements became irregular in the legs, as shown by the tracings, but this irregularity, caused by jerking movements, must not be confounded with tremor, which has the same rhythm in the foot as in the hand.

Diagnosis.—It is probable that none of the phenomena of hysteria, unless it be some of the paralyses, more closely resemble the symptoms of organic disease, and are therefore more difficult to be recognized, than tremor. "It is in this fact," says Dutil, "that is found the explanation of those almost miraculous cures of paralysis agitans obtained with a simple play of mirrors; of sclerosis en plaques without plaques of sclerosis." The importance of this study can be fully appreciated only when it is remembered that the diseases which tremor simulates are among the most hopeless in nervous pathology, such as paralysis agitans and insular sclorosis; or are the subjects of litigation in our courts of law, such as

the so-called traumatic neuroses; or finally, are the products of poisons, taken in the arts or in self-indulgence, such as mercury and alcohol. Hence the study of diagnosis must be supreme yet for a long while, until at least such an array of clinical facts will have been obtained as will supply some criteria to which successful appeal can be had in doubtful cases. I shall consider the subject in brief paragraphs, devoted *seriatim* to these several diseases.

The tremor of paralysis agitans is said to be closely simulated by some tremors of hysteria. In it the rhythm is slow, and persists during repose, not being exaggerated by voluntary movements. This form, there is reason to believe, has misled some competent observers, who have made extraordinary claims of having cured cases of shaking palsy. Rendu's paper was inspired by the report of a case of Luy's, which the latter claimed to be a case of paralysis agitans cured by rotating mirrors. This case was caused by trauma, and began with tremor in the hands, headache, and general weakness. After a while the disease suddenly grew worse; pains in the loins came on, and the gait became impaired. The speech was embarrassed, being monotonous and drawling. The face was immobile, the eyebrows elevated. The tremor was localized in the hands, except in the upright position when the trunk was involved; "when one placed a hand upon the patient's shoulder he felt under the hand a general tremor of the whole body." The oscillations were slow and rhythmical as in paralysis agitans. On voluntary movement the tremor augmented notably in amplitude; if the patient attempted to lift a glass of water to his lips the tremor was increased, and interfered with the act. There was no nystagmus; nor were any hysterical symptoms noted. This patient was treated with revolving mirrors, and after a mild hypnotic sleep, and some suggestion, got practically well. Joffroy cast doubt upon the correctness of the diagnosis of the case, and it is significant that the disease had been diagnosed by equally eminent Paris neurologists as paralysis agitans on the one hand, and insular sclerosis on the other. I give the details of the case because they illustrate practically many essential points. Thus the tremor *was* much exaggerated on voluntary movement, although it persisted during repose. This is the characteristic "type Rendu" of hysterical tremor, and is unlike either paralysis agitans or insular sclerosis. Again, opinions had differed about the diagnosis. This would be extremely improbable in the case of either of these two organic diseases, which are not difficult to recognize. This disagreement suggests at once something *bizarre* about the case. Finally, the fact that the case was cured by hypnotism is enough to convince most neurologists (those at least who dwell outside of France) that the disease could not have been either paralysis agitans or sclerosis en plaques. It must have been a neurosis.

From my own observations I conclude that the disease most simulated

by hysterical tremor is insular sclerosis, or sclerosis en plaques. The points of this resemblance are as follows: First, the character of the tremor. In insular sclerosis the tremor is excited, and much exaggerated by voluntary motion. The movement of such a patient attempting to carry a tumblerful of water to his lips is characteristic. This movement is really not so much a tremor as a jerky to-and-fro motion. During repose, however, the tremor is almost, if not quite, absent. Second: The speech is often drawling, monotonous, or embarrassed. Third: The mental faculties are seldom involved, but the patient is often emotional. Fourth: The age coincides with that in which hysterical tremor is common; especially in women—from twenty to forty years. The points of contrast, however, are equally marked and definitive. They are as follows: First: The tremor most common in hysteria, that known as the "type Rendu," is persistent and very evident during repose. Even when the patient sits up it is much exaggerated, and imparts a sense of general tremor to the hand of the observer when he presses it upon the patient's shoulder. While it is much exaggerated by voluntary movements, and often is marked by waves of exacerbation passing over the patient's frame, it does not lose its essentially rhythmical tremulous character, and become as jerky and incoördinate as in insular sclerosis. This fact is confirmed by Charcot, who says that while the amplitude varies the rhythm does not. It is also much increased usually by simply watching the patient—a most significant fact. Second: While the speech may be affected, especially in typical hysterical ways, as aphonia, the drawling, stammering speech of sclerosis is not truly imitated. It is but just to say that this statement is not exactly in accord with some French observers. Third: The mental faculties exhibit hysterical perversions and lacunæ which are not common, in my observation, in insular sclerosis. Fourth: There are no pupil-changes, nor nystagmus. Rendu says that nystagmus has never been noted in hysterical tremor. Fifth: Hysterical stigmata can always be elicited, as a rule, by an expert examiner. These points of comparison and contrast are drawn from my own observation, and are confirmed by the case here reported. I think these deductions are almost universally applicable, because, while not denying the various types of hysterical tremor of Dutil and Charcot, I am strongly inclined to believe that this particular "type Rendu," as seen in my case, and in many others, is the most common of the grave and persistent varieties of the disease. It was the type seen in the cases of Luys, of Mitchell, and in a still more remarkable extent, in the two cases of Westphal. The last writer[1] describes two cases of tremor, the more remarkable because the autopsies alone corrected the error of diagnosis. These two patients had had spastic paralysis for some years, as in insular sclerosis. They had rhythmical

[1] Arch. f. Psych. u. Nervenk., 1883. (Abstracted by Rendu.)

oscillations of the neck, interrupted by spasmodic contractures. The gait was tremulous and interfered with by shocks. The patients could not stand without their limbs being agitated with wide oscillations. Passive movements met with great resistance; active movements caused tremor in proportion to their extent. In the upper limbs there was paresis; no tremor during repose; but on voluntary movement oscillations occurred. One had tremor of the muscles of the face during speech. There was no nystagmus. These patients had many hysterical symptoms —as apoplectiform attacks, hemiplegia without involvement of the face; other fugacious symptoms, as localized motor and sensory paralyses. Death occurred from extrinsic causes. Westphal secured an autopsy in each of these cases. These autopsies, made with the greatest care, were absolutely negative. In brain and cord no evidence of sclerosis in plaques was observed. The nerves were healthy. Westphal concludes: "There exists a general neurosis which may be called pseudo-sclerosis, and which can be distinguished from true sclerosis in plaques neither by its symptoms nor by its progress." This pseudo-sclerosis of Westphal has been relegated justly by French writers almost unanimously to the catalogue of hysterical tremors. The accuracy of his statement that the affection cannot be distinguished from true insular sclerosis is more than doubtful. Rendu also describes two cases, in one of which he had made a diagnosis of insular sclerosis. In these cases some of the ordinary stigmata of hysteria were always present, as apoplectiform and epileptiform attacks, evanescent paralyses, and sensory changes, as anæsthesia, etc. "It follows from these facts," says Rendu, "that in some cases, less rare probably than is supposed, hysteria may show itself clinically by a generalized tremor, resembling that of sclerosis en plaques." "The error is the more easy to be made as the cerebral symptoms of sclerosis are represented, and as the troubles of intelligence and of speech are closely analogous in the two cases." Finally, he claims that the character of the tremor does not constitute a certain criterion.

From the practical standpoint the recognition of hysterical tremor due to trauma is of the utmost importance. Accidents by rail and by machinery have become so common, and in consequence litigation over damages is so frequent, that every subject connected with such accidents is bound to be tested with the most rigid scrutiny. The subject is one of peculiar difficulty, and can be treated here but briefly, and only for the purpose of emphasizing what has been said already, *i. e.*, that in cases of tremor hysteria must be recognized on the one hand, or eliminated on the other, as the case may be, before testimony can be regarded as thoroughly scientific. It is now a too well-recognized fact that hysterical tremor is frequently caused by trauma to be ignored. Oppenheim, and those who blindly follow him in this country, seek to disguise old facts under new terms, as "traumatic neuroses," etc., but

some at least of their writing does not stand an exact criticism. Charcot, who notes that this tremor is frequently referred to in recent reported cases of "traumatic neuroses," says that this "ought to be included in the history of hysteria, and to be recognized more frequently in men." This opinion is shared by Gilles de la Tourette. Even Oppenheim,[1] in his description of the tremor following concussion, emphasizes its hysteroidal character. "These tremors," he says, "are increased when the patient is watched by the physician, showing the mental causation. . . . The fact that these lessen when the attention is withdrawn from them, or during rest, is another matter suggesting simulation. I have occasionally seen tremors which closely resembled those of sclerosis. The intimate relation of these shakings to the mental state of the person afford differential points." The hysterical character of the symptom could not be more clearly indicated. Clinically, this tremor following trauma, cannot be distinguished from the tremor of hysteria, while it is identified with the latter usually by well-known stigmata.

The toxic hysterias claim our attention here for a moment. Tremor is a well-known evidence of various toxæmias, specially of alcohol, lead, and mercury. It is not always easy, however, to eliminate from these cases the etiological factor of hysteria. These toxic hysterias, as, for instance, lead hysteria, present some difficult problems. It is common to attribute all the patient's nerve symptoms to the poison from which he suffers. But the problem often is: What is the relation of hysteria to the manifestations attributed to the poison? Few persons in this country can have failed to observe hysterical symptoms, often grave, in chronic alcoholics. The same class of symptoms may be seen occasionally in cases of poisoning by lead and mercury. Pitres gives an interesting case of hysterical tremor after delirium tremens. The man had other hysterical symptoms, and his tremor was cured with a magnet. The syndrome hemiplegia and hemi-anæsthesia in lead-poisoning, is, according to Charcot, nearly always hysterical. Letulle[2] has written a long paper on the neuropathic manifestations of an hysterical nature supervening in the course of chronic mercurial poisoning. He found hemi-anæsthesia and hemiplegia coextensive; apoplectiform attacks of an hysterical kind; circumscribed contractures; and hemi-tremor, post-hemiplegic and rapidly cured. Finally, he found remarkable transfer phenomena: passing of a hemi-tremor from one side to the other, and passing of dyschromatopsia from one eye to the other under the influence of a magnet. Letulle says, truly, that if these were not mercurial cases no one would hesitate to describe them as male hysterics. This tremor of mercury has been stopped by faradism; or by causing the patient to

[1] Quoted by Clevenger. "Spinal Concussion."

[2] De l'Hystérie Mercurielle. Bull. et Mém. de la Soc. Méd. des Hôp. de Paris, tom. iv., 1887, p. 370

squat and walk in this position, although when erect he could not walk for the tremor (type Rendu). The fact seems to be that the metallic poisons, as well as alcohol, can excite hysterical symptoms in predisposed persons; and the fact of alcohol being a well-known hysterogenous poison is a presumptive proof of the same power in lead and mercury, and especially with reference to tremor. The whole subject needs further investigation.

The paraplegic type of hysterical tremor may closely simulate the so-called spinal epilepsy of Brown-Séquard due to organic cord disease. The resemblance is increased by hysterical contractures and hysterical dysuria. The rhythmical reflexes, or clonus of organic cord disease are, however, excited, as a rule, only by putting the muscles in tension. Volition has not so much to do with them as this state of tension, even artificially produced; for instance, resting the balls of the toes on the floor, with the heels elevated. Attention, or the sense of being watched, has no influence. The movement is entirely involuntary and organic. The presence or absence of hysterical signs also avails for diagnosis.

The tremor of hysteria is said to resemble sometimes that of Basedow's disease, and also that of general paresis; but in both these affections other and characteristic symptoms would determine the diagnosis.

The case which I have to report is a rare one, at least in this country, where the grave forms of hysteria are either not as common, or not as carefully observed, as in Europe. It is of special importance, because it not only simulated an incurable organic disease, but it directly threatened the life of the patient. It presented a most inveterate example of the "type Rendu" of hysterical tremor, but this was associated with an obstinate anorexia and vomititing of food, which had brought the patient almost to the last stages of starvation.

L. E., female, aged twenty-six; residence in a small farm-house in one of the interior counties of Pennsylvania. The patient's history is uneventful. She is a member of the religious sect known as Mennonites, whose ways of life are very simple. A few years ago she had a slight heat-stroke—or, at least, heat-exhaustion—while doing a man's work in the hay-field on a very hot summer's day. Her father thought that she was never so strong afterward. In January, 1890, during the epidemic of "la grippe," she was taken very ill with the disease, and in March following had pneumonia. Her strength was thus greatly reduced, and from this period begins, apparently, the grave neurosis. It was called at the time nervous prostration. In two months more she was quite bedridden, and paralyzed in her legs. About this time her case began to attract attention, and to be talked about in the rural community quite far and wide. At one time, for some purpose, she was carried on a stretcher by six men a distance of nearly three miles. The paralysis and invalidism continued for one year (until April, 1891), when she began walking with the aid of canes, and soon improved very rapidly. It is not stated whether tremor existed during this first period of her illness. In June, 1891, she took, by mistake for Epsom salts, a large dose

of nitrate of potassium (ordinary saltpetre). This caused some pain and irritation of the stomach, but was not followed by any directly serious results. It caused great alarm, however, in the household and in the patient. She and her friends firmly believed at the time, and for a long while afterward, that the "coats" of her stomach had been destroyed, and that her kidneys had been ruined. From this begins the epoch of her most profound hysterical perversions. The mental impression, acting as a sort of auto-suggestion, was the direct cause of her beginning to reject food. This food-rejection became the most serious feature in her case. The fright was the direct exciting cause also of the most persistent tremor. These two symptoms, thus directly referable to the same cause, progressed, side by side, and constituted henceforth the chief clinical features. They persisted during the remainder of the year 1891. About Christmas another, but slight attack of influenza, induced aphonia, which henceforth persisted as an hysterical "fixture." In this state, with few and imperfect remissions, the case continued until May, 1892.

At this time I visited her at her father's house in the country—a remote farm-house. She was reduced to a skeleton, was quite bedridden, and was lying in a room on the ground floor, from which the light was kept shut out, and which was in consequence quite cold and damp. Her chief symptoms were the vomiting and the tremor.

The vomiting was as follows: While lying on her side the patient had constantly under her face and chin a large linen or muslin cloth. Her relatives kept this all the while in place, because in her movements it would become displaced. As she lay thus, she had at frequent intervals a violent retching, which, as her stomach was almost always empty, brought up only a little mucus and saliva. After taking food, which she took in very small quantities at a time, she almost immediately rejected it by a sort of regurgitation, rather than vomiting—so that it is probable that all the food did not really enter the stomach. Some food, of course, she retained, but her relatives told me that the gagging and retching movements were continued at intervals of a few seconds during her waking hours. They were worse when the patient was observed by strangers. They did not appear to be attended with nausea. Her appearance was sufficient proof that her stomach received and digested the smallest amount of food necessary for life. She was extremely emaciated. The calves of the legs, although the seats of constant tremor, were flat and without contour, as is seen in cases of progressive muscular atrophy. Her arms were similarly wasted. Her face, neck, and body were likewise reduced. The belly was scaphoid, and the parietal muscles were rather tense, and the seat of constant tremor. It was noticeable, however, that the color of the mucous membrane of the lips was good.

The tremor was as follows: It was general, that is, it involved all four limbs, and was imparted very distinctly to the hand laid upon any part of the trunk. The head and neck also vibrated. It was constant during repose, but it was increased when the patient was watched, and by voluntary movement. Even during repose waves of exacerbation, as it were, passed over the patient's body. It interfered so much with movement, and especially with walking, that the patient was practically paralyzed, although she was not really paralyzed, for she could move her legs and arms. It was rhythmical, but in the legs occasional shocks and jerks interrupted the rhythm. It was not exactly like any other tremor that I have ever seen, in this respect not agreeing with the French parallels.

It was somewhat like a prolonged or constant shivering of a person who is very cold, or who has a chill. On voluntary motion, its amplitude was increased, and it was interrupted by shocks, so that then it more resembled the tremor of insular sclerosis. It was, and had been, very persistent, for her friends told me that it began soon after the false alarm at the poisoning, and had continued therefore for almost one year. It ceased during sleep.

The violent motor agitation, with constant vomiting and the eructation, gave the patient an extraordinary and ghastly appearance.

The patient had aphonia. She made an effort to talk, but very little sound came from her larynx.

She had retention of urine, sometimes for as long as two days. This was originally caused, I think, by the belief that her kidneys had been damaged by the saltpetre; but as the evil habit became fixed, it still further confirmed this belief, both in herself and in her family.

A few days later she was removed, at her own request, to Philadelphia, where she remained for several months until she was quite cured. For most of this time she was in the Home for Crippled Children.

The following is a brief history of the case while under my immediate care in this city:

The tremor was accurately studied on tracings. In this work I was assisted by Dr. W. S. Carter, of the University of Pennsylvania. These tracings are reproduced here for illustration.

FIG. 1.

FIG. 2.

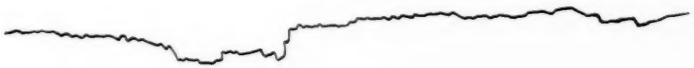

FIG. 3.

Fig. 1 shows the tremor of the hand and arm. It is steady, rhythmical and unvarying except at two places. One of these places is especially noticeable. They correspond to the waves of greater intensity, which swept over the patient's frame at intervals, especially when she was observed. They were not produced by voluntary motion, because the patient was lying at ease upon the bed while the tracings were being taken. These places, the larger one toward the left especially, show some increase in amplitude, but no change in the rhythm—a fact which corresponds exactly with the statement of Charcot. At some places a slight prolongation is seen at the point of the wave.

The number of vibrations per second was from seven to nine.

Fig. 2 precedes Fig. 1 in point of time. In it the tracing is very irregular. A true rhythm is seen, but the tracing indicates a jerky and incoördinate movement, more like that of insular sclerosis, although not so wide. These incoördinate movements really existed, because while this tracing, which was one of the first, was taken, the patient was not a little excited by the novel procedure.

Fig. 3. This tracing was taken from the foot. It is also irregular, but it is fairly accurate. The tremor in the legs and feet was continually interrupted by shocks and tonic movements of extension. These are shown in the tracing by the widely irregular line. In the long, almost straight line, the tremor is very limited in range, but of about the same rhythm as in the hand.

On the whole, these tracings (Figs. 2 and 3) more resemble those of insular sclerosis than of any other disease; and, perhaps, justify the statement that the character of the tremor alone is not sufficient to differentiate hysterical tremor. In this case the tremor was of the "type Rendu," or "intentional." It persisted during repose, and was exaggerated, but not increased in rhythm, on voluntary movement.

The patient had other hysterical stigmata during her early sojourn in the Home, as follows:

Hysterical aphonia persisted until her cure was almost complete.

Hysterical anuria, or rather retention, persisted for a short period. It lasted from twenty-four to forty-eight hours.

Very marked hysterogenous points and zones were found. One of these was in the dorsal spine; others were over the ovaries. By pressure over the ovaries the motor disorder was greatly increased; the tremor passed into a tonic rigidity of the muscles, which soon developed extreme opisthotonos, and would soon, I am sure, have excited a convulsion. But this was purposely avoided.

Sensory symptoms were never observed. Unfortunately a complete study of the fields of vision was not made.

The anorexia and vomiting continued for a few days, but never so severely as at home. They were overcome by the tact and management of a good nurse.

The history of the case in this city was one of slow but steady improvement. The patient had for a time a most annoying hysterical cough. The tremor persisted for several weeks, and was the last symptom to yield. In August the patient travelled alone to the seashore, and by October was robust, and without any sign of tremor.

The secret of success in treating the case was in removing the patient from her home, putting her under a good nurse, and using tact, encouragement, food, and good *morale*, with very little medicine.

Before closing, I desire to add a few words on the subject of anorexia and vomiting in hysteria. These symptoms, as all other hysterical symptoms, are dominated by a mental state which is often difficult to unravel. My case is interesting, because it shows a profound mental impression made by a supposed poisoning as the exciting cause. The case is interesting also because to the anorexia there was added the peculiar hysterical vomiting. These two symptoms, anorexia and vomiting, are by no means always associated. Lasègue, in his classic

essay[1] on hysterical anorexia, describes a condition of prolonged and persistent refusal of food, with preservation of a wonderful vitality, which is not necessarily, or even frequently, accompanied with vomiting. Sir William Gull[2] described a series of similar cases in which refusal, not vomiting, of food was the symptom. Where vomiting is added to anorexia, as in my case, an element of danger is found which does not appear to have been present in most of Lasègue's and Gull's cases. This hysterical perversion is not new, even in literature, but is not often seen in an extreme degree. I find an observation as long ago as 1789, by Naudeau,[3] who describes a case of hysterical anorexia, with forced expectoration of thickened and glutinous sputa, where the patient "excited frequently the desire to vomit by the continual efforts which she made to detach from the depth of her throat viscid and tenacious matter." The history of hysterical localizations in the stomach is a lengthy and important one.

GONORRHŒAL MYOCARDITIS.

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In spite of the fact that gonorrhœa is one of the most common diseases, our knowledge of the pathological lesions is obscure. This is due to the fact that the disease is not open to experimental investigation, and acute cases rarely come to autopsy. We know but little of the exact character of the lesions in the mucous membrane of the urethra, and the secondary lesions are still more obscure. It will not be worth while to go over the general literature with regard to the part which the organism described by Neisser, in 1881, plays in the process. Since Neisser's description of the organism our knowledge concerning it can be briefly stated as follows: It is agreed by all, or nearly all, who have studied the disease, that the gonococcus is found in the discharge from the urethra in all cases of acute gonorrhœa. The organism is characterized by morphological, staining, and cultural properties. It is easily recognized, being stained by most of the aniline colors. It is a micrococcus, and is always found in pairs or in tetrads. The single organisms are not perfectly round, but have more or less of a biscuit shape, the adjoining sides of each pair being flattened. It often presents a rather peculiar appearance in the pus cells, being crowded in one side of the cell and

[1] De l'Anorexie Hystérique. Arch. gén. de Méd., April, 1873, p. 385.
[2] Anorexia Nervosa. Trans. Clin. Soc., Lond., 1874, vol. vii. p. 22.
[3] Sur une Maladie Nerveuse. Journ. de Méd., Chir., Pharm., etc., Juillet, 1789, p. 197.

pushing the nucleus before it. The nucleus of the cell is never invaded. Unlike the ordinary pus organisms, it is decolorized by the solution of iodine used with the Gram stain. It also differs from the pus organisms in its cultural properties. It will not grow on the ordinary culture media, and so far it has only been possible to cultivate it on solidified human blood-serum or on a mixture of this with agar-agar.

The organism has only been cultivated by a few observers, and its cultivation is attended with great difficulties. The first successful cultivation, and the first exact study of the inflammations caused by the organism were made by Bumm. Bumm succeeded in growing it on human blood-serum, which he obtained from placentas. His studies of its pathogenesis were made on the conjunctiva, where he succeeded in producing a typical gonorrhœal inflammation by inoculating the mucous membrane with pure cultures of the fourth and fifth generation. According to Bumm, the action of the organism is essentially superficial; he found that when the conjunctiva was inoculated with a pure culture the first effect was the production of hyperæmia with an increase in the conjunctival secretion. The organisms attacked first the superficial layers of the epithelium, and were generally found between the epithelial cells and occasionally in the capillary bodies. On the second day after the inoculation there was a marked emigration of leucocytes from the vessels beneath. Some of the leucocytes entered into the epithelium along with the cocci, pressing aside the epithelial cells. When the epithelium is destroyed a layer of fibrino-purulent exudation is formed which contains masses of the organisms. The organisms do not enter into the connective tissue. Bumm found that the epithelium of the cornea is not invaded by the organism, which appears only to attack cylindrical epithelium or epithelium closely related to this.

Thus he found that the gonococcus does not grow in the mucous membrane of the vagina, and he considers gonorrhœa in the female to be an affection either of the urethra or of the cervix uteri. Bokhardt claims to have cultivated the organism, and studied the result of inoculation into the urethra. He injected into the healthy urethra of a man, forty-five years old, what he supposed was a pure culture of the gonococci, and obtained a characteristic discharge with a secretion containing a number of the organisms. The man was affected with an incurable nervous disorder. He died ten days after the injection from a hypostatic pneumonia. At the autopsy an intense acute inflammation of the urethra, of the bladder, and of the pelvis of the kidney was found. In the sections made from the tissues Bokhardt obtained the organisms. No one, on carefully reading the article of Bokhardt's, can fail to be convinced that the disease which he produced in the man was not gonorrhœa, but a purulent infection. It is more than probable that his cultures were not gonococci, but some of the pus organisms. They were grown on

agar-agar, and all the evidence which we have on the subject shows that the organisms do not grow on this media. Bokhardt's description of the pathological process in the urethra differs materially from that described by Bumm in the conjunctiva. Bokhardt, in sections of the urethra, found the organisms both in the epithelium and in the submucous tissue. In the deeper tissues they were found chiefly in the lymphatics, which were often completely plugged with them. The illustrations which accompany the article of Bokhardt's show that the supposed organisms which he found in the deeper layers of the tissue were not gonococci, but probably the granular plasma cells.

Although the pathology of chronic gonorrhœa in the urethra and the lesions following this have been carefully worked out by Finger and others, we have not been able to find in the literature a single case, with the exception of the case of Bokhardt's, to which we have referred, in which the lesions in acute urethral gonorrhœa, and the part which the gonococcus plays in their productions, have been studied.

The secondary affections following gonorrhœa have been more carefully investigated. These secondary infections may be briefly stated to consist in purulent inflammations of the canals and passages in both male and female, connected with the urethra, or vagina, acute swellings of the inguinal glands, acute inflammation of the joints and synovial surfaces, and pericarditis. There are two theories with regard to the pathogenesis of the secondary infections. They have been considered by some to be the result of an extension of the gonorrhœal process and an infection of remote parts with gonococci; and by others to be the result of a mixed infection, and to be due to various organisms, especially the pus organisms which have entered into the tissues from the local lesions and been carried to the various secondary foci. Gonorrhœal rheumatism is the most common of the remote secondary affections following gonorrhœa, and a great deal has been written about it.

One of the most extensive articles on the subject is that of Loeb, in the *Deutsche Arch. für klin. Med.* Different authors give different figures as to its frequency. Fournier, who has had the most extensive experience and the largest number of statistics, gives one case of joint affection to sixty-four of gonorrhœa. Besnier gives the relation of one to fifty, and Grisolle as one to thirty-five. Loeb, without giving any definite figures, thinks that the affection is much more frequent than would appear from these figures. Some authors are disposed to deny any connection at all between the rheumatism and the gonorrhœa; others think that there must be an especial predisposition to rheumatism, which is called into activity by the urethral affection. In some cases the rheumatism does not seem to be produced early in the disease. It frequently follows a torpid state of the gonorrhœa, and rarely appears before six to fourteen days from the beginning of the attack. As a

rule, most authors agree that the rheumatism is only seen when the gonorrhœal process attacks the posterior portion of the urethra. It is certainly much more frequent in men than in women. There seems to be a marked difference in the symptoms produced in gonorrhœal rheumatism, as compared with ordinary acute rheumatism. Fever may be entirely absent in gonorrhœal arthritis, and even when it is present it has not the same long duration, and it may disappear while the affection of the joint obstinately continues. In some cases, however, there may be a considerable increase of the temperature in gonorrhœal rheumatism. Its duration is longer than the ordinary rheumatism. The number and situation of the joints differ in the two cases. Generally speaking, in the gonorrhœal rheumatism fewer joints are affected than in the ordinary form. The knee-joint is one of those most frequently affected. The joints of the upper extremities are very frequently free. In Nolen's 118 cases the wrist-joint was affected twenty-six times, and in Fournier's 119 cases, only fourteen times. There is a further difference between the two affections in the result of the treatment. The gonorrhœal joint affections do not yield to the treatment with salicylates as do the ordinary forms. In a very few cases does the arthritis lead to suppuration and destruction of the joints.

Affections in the peri- and endocardium are also frequently seen as a complication of gonorrhœa. They are usually seen in combination with rheumatism, but they are far less frequent in gonorrhœal rheumatism than in the other forms. Zeissl regards the comparative freedom of the peri and endocardium from infection as characteristic of gonorrhœal rheumatism. Nolan found fifteen cases in which the heart was affected in his 116 cases of gonorrhœal rheumatism, but it is probable that his figures are overdrawn. There are a number of cases reported clinically in which an affection of the peri- and endocardium has been found in gonorrhœa. Traube makes repeated mention of heart affections in gonorrhœa.

With regard to the bubos there need be no special reference. They are frequently found in gonorrhœa in both the male and female. The cultures made from the glands after removal are usually sterile.

In a number of cases organisms which have been considered to be gonococci have been found in association with these secondary lesions. Petrona claims to have found cocci in the joint affections which were similar to those found in the urethra, and he even found them in the blood in cases in which the joints were affected. Kramer also found gonococci in the joints. They were present in one of his cases, and in the other no organisms at all were found. Hahn has found cocci in gonorrhœal affections of the joints, but he does not regard them as true gonorrhœal organisms, but simply as pus organisms. He says that they are only found in cases where the process is fresh, and advancing

rapidly. Where the process is more chronic, they are not found. Haslund believes that the gonorrhœal rheumatism is due to a specific infection from the inflamed mucous membrane, but he was not able to find the gonococci in the joints. Leistikow investigated four cases of gonorrhœal arthritis, and found no organisms in the contents of the joints, nor in the blood of the patients. Hartley investigated a number of cases of gonorrhœal rheumatism, in which he found typical cocci in the fluid. In a recent publication, however, he inclines to the belief that the secondary affections are due to accidental infection with other organisms. With regard to the cardiac affections in gonorrhœa, they appear to be usually either cases of pericarditis or of endocarditis. Schaedler published a case of endocarditis ulcerosa which followed a gonorrhœal rheumatism, the rheumatism appearing three weeks after the beginning of the gonorrhœa. Eight months later symptoms on the part of the heart appeared which resulted fatally.

Glusinski describes thirty-one cases in which complications on the part of the circulation were found in the course of gonorrhœa. All of his cases were clinical. His reports a case in which organisms, apparently the gonococci, were found in the vegetations on the aortic valve, in a case of endocarditis which appeared several weeks after a gonorrhœa.

The gonococci have been found by various authors in the buboes following gonorrhœa, in the peri- and para-urethral abscesses, and in the various other local lesions. They have also been found in the tubes in cases of salpingitis following gonorrhœa. So far as we can see from this brief review of the literature, there are a number of varying opinions as to the pathogenesis of the secondary gonorrhœal affections, some believing that they are due to a specific infection with gonococci, while others believe that they are due to an accidental infection with other organisms which enter the tissues from the local lesions in the urethra.

The following case is of much interest, not only on account of the unusual character of the lesions, but from the opportunity which was given for a close histological study of the acute process in the urethra and elsewhere. The case is from the Boston City Hospital, in the service of Dr. A. Post, to whom I am indebted for the notes of the case.

It is that of a man named W. H., admitted to the hospital September 30, 1892. Urethral discharge first noticed four weeks before admission. Ten days after the gonorrhœa was first noticed, the left knee began to swell and became painful. This condition lasted three or four days, then extended to the right knee. Since the attack he has had pain and swelling in the fingers, shoulders, and ankles. Cannot take long breath on account of pain in chest. On October 6th, the pain in chest ceased, after having lasted from entrance. Pain in right knee persists. Temperature remains normal. October 7th, he complained of much pain in chest. On examination, there was a slight increase in cardiac dulness, but no murmur or pericardial rub. October 8th, pain in chest continued and leeches were applied for its relief. October 9th, slept well, awoke at six A.M. and drank some milk. At seven, cried out as

in pain and fell out of bed. The house officer, who was summoned at once, found the patient gasping for breath and no pulse perceptible at wrist. Patient died almost immediately after being seen by house officer. Temperature during the whole course of the attack did not exceed 99½°. The pulse kept under 110. The respirations were accelerated. The autopsy was made twenty-eight hours afterward.

The body was of medium size, slightly built, badly nourished. The general surface cyanotic. Both knee-joints, especially the right, enlarged and gave clear fluctuation. The subcutaneous fat small in amount; muscles rather pale, somewhat diffusely stained with blood. The spleen slightly enlarged, both that and the liver free from adhesions. No adhesions in peritoneum. Peritoneal surface smooth everywhere. Diaphragm depressed on left side. Both lungs free from adhesions and compressed by distended pericardium. The posterior and lower portions of both lungs congested and œdematous. Mucous membrane of bronchi congested; vessels at root of lung free. Pericardium enormously distended. The external surface congested and covered with small hemorrhagic foci. In the pericardial cavity a large amount (about 800 c.c.) of hemorrhagic exudation, in which there are large masses of clot. Both surfaces of peritoneum covered with thick membraneous masses, containing hemorrhages. The heart is firmly contracted. The aorta is very narrow. The myocardium of left ventricle is firm and of a peculiar pale waxy color, somewhat resembling amyloid. Toward the endocardium, especially about the base of the papillary muscles, the tissue has a grayish translucent, gelatinous appearance. This extends in places into the tissue of the myocardium for a considerable distance. It is especially marked toward the apex of the ventricle. In places this pallor and translucent appearance is associated with marked hemorrhagic infiltration. This condition of the myocardium is almost confined to the left ventricle. There is some evidence of it on the right side, but it is not so well marked. On the anterior inner surface of the left auricle there is an area of 2 x 2½ cm., where the muscular tissue is substituted by a pale opaque tissue; the centre of this soft and almost broken down. The spleen is enlarged; the follicles prominent. Both liver and kidneys show slight acute swelling. All of the follicles of both large and small intestine are enlarged and hyperæmic. In the small intestines the follicles have the character of small polypi. The Peyer's patches are enlarged, but there is no ulceration. All of the mesenteric lymph glands are slightly enlarged. The right knee-joint is greatly distended. On section, about 100 c.c. of gelatinous pus escapes. The pus is stringy and rather transparent. The muscles above the joint in the immediate neighborhood show some diffuse purulent infiltration. The synovial membrane of the joint is swollen and intensely congested. There are papillary fungoid projecting masses of granulation tissue extending into the joint, having somewhat the appearance of masses of tuberculous granulations. On section, these projecting masses have a white opaque edge, and below this the tissue is gelatinous and œdematous. The left knee joint contains a smaller amount of this material. The joint is somewhat altered, but not to the same extent as the right. There is no general glandular enlargement.

The entire mucous surface of the urethra appears to be thickened and softened. The peri-urethral tissue is thickened and dense. About four cm. from the meatus there is a slight ulceration on the surface apparently only involving the mucous membrane. The mucous surface is covered with a slight purulent exudation. Pus can be squeezed from the seminal ducts, and there is a purulent infiltration extending from here into the prostate. In each side of the prostate an extensive purulent infiltration of tissue with softening, and on the left side a distinct abscess. The seminal vessels, testicle, and epididymis show no alteration.

Microscopic examination of the pericardial exudation showed hemorrhage, large numbers of pus cells, and large epithelioid cells. No gonococci were found in this exudation. The examination of cover slips made from the urethra and from the knee-joint showed the presence of gonococci. They

were abundant in the urethra, but comparatively few were found in the joint. In both places the organisms were only in the pus cells and appeared to be identical. It is to be regretted that at the time it was not possible to make cultures from the tissues. All of the tissues were hardened in alcohol and subsequently examined.

Microscopic examination of the urethra. Sections of the gland show no lesion of the epithelium. Here and there on the surface there are adhering pus cells, some of which contain the gonococci. There is a gradual transition of the epithelium of the glands into that of the modified cylindrical epithelium of the urethra. The epithelium of the urethra is composed of numerous layers, but the cells have more the character of the cylindrical epithelium. The pigmented layer disappears and the papillæ become less prominent. Just within the urethra there is a deep crypt with several papillary projections of its wall. Here and there over the surface of this the epithelium appears to be broken through and there is an intense round-cell infiltration of the submucous tissue. There are very few pus cells mixed with the round-cell infiltration. The tissue immediately beneath the mucous membrane, along almost the entire extent of the urethra, shows a round-cell infiltration which is more or less focal, and in some places being more intense than in others. In the vessels of this tissue there are a comparatively small number of leucocytes, in places emigration is apparently taking place. The plasma cells in the tissue are very numerous, and many of them appear strikingly like cells filled with micro-organisms. There is no basement membrane, giving a sharp line of demarcation between the epithelium and the tissue beneath. In the epithelium there is a considerable number of polynuclear leucocytes among the epithelial cells. In places there are irregularities on the epithelial surface, and small depressions resulting from the softening and breaking down of the cells. Gonococci are found in relatively small numbers. They are in the epithelium, both between and in the cells, but the greater part of them are found in the pus cells, on the surface of the epithelium, and between the epithelial cells. None are found in the deepest layers of the epithelium, nor are they in any of the tissues outside of the epithelium. Nuclear figures are found in the epithelial cells in the lower layers corresponding to the place where the lesions of the surface are most marked. The gonococci were found both as masses filling up the entire cells and as single pairs. The mucous membrane throughout the urethra in all of the sections appears to be softened and exfoliated, and in places the granulation tissue is directly continuous with the surface. The sub-epithelial crypts show about the same condition as the surface of the urethra. The mucous membrane in places is entirely absent and the granulation tissue comes to the surface. The cells found in the granulation tissue are of the ordinary types: both ordinary granulation cells and those with larger nuclei. The gonocooci are always most abundant where the purulent infiltration of the mucous membrane is most intense. They were found in the crypts and in the pockets of Morgagni, but in general they were less numerous here than on the surface of the urethra. Deep down in the tissues there are no lesions whatever to be made out. On sections passing through the membranous portion of the urethra near the prostate, cutting across the numerous ducts and crypts, the same condition was found as in the other portions of the urethra. In the prostatic ducts there was an intense purulent inflammation, but very few gonococci were found. In many places the epithelium was entirely destroyed. This condition extended up into the prostate, and on one side of this the tissue has entirely broken down, resulting in the formation of an abscess. No gonococci or other organisms were found in the abscess. The only other organisms found in the urethra were a few short bacilli on the mucous surface which apparently had nothing to do with the inflammation and were only accidentally present.

Sections of the heart from various places were examined after being hardened in alcohol. There is everywhere an intense pericarditis. The pericardium is universally thickened and swollen. In some places it has a thickness of 2 or 3 mm. The surface is generally smooth, but in places there

are well-marked papillary projections. There is some fibrin loosely adherent to the surface, but there is no definite fibrinous exudation. In the thickened pericardium there are numerous widely dilated bloodvessels with thin walls. It is probable that the blood found in the pericardial cavity came from the rupture of these vessels. The thickened tissue of the pericardium is loose, infiltrated with pus cells, and contains numerous large round cells, some of which enclose pus cells in their interior. There are various changes in the myocardium, which are more extensive close to the endocardium than elsewhere. In the least-marked lesions in the myocardium there appears to be simply some infiltration with pus cells along the connective-tissue septa which are thickened and swollen. In some places the lesions in the myocardium, although most intense near the endocardium, appear to extend from the pericardium and can be traced directly to this. In all of the areas where the purulent infiltration is seen there are various degrees of degeneration of the muscular fibres. In the slightest change they appear to be slightly swollen, diffusely stained, their nuclei disappear, and they frequently contain vacuoles. There is every degree of change from this up to a total necrosis of the muscular fibres, and an entire substitution of areas of purulent infiltration and necrosis for the normal tissue of the heart. There is little or no formation of granulation tissue. Some of the areas where the degeneration is most extensive involve almost the entire thickness of the ventricle, extending up to the pericardium. In such places there are large areas of necrotic tissue with a purulent infiltration extending widely into the tissue beyond the necrosis. The most pronounced lesion is found in the left auricle. In this there is a very large area of necrosis and suppuration which involves the entire thickness of the wall. Extensive hemorrhage was found in some of the necrotic foci. This was most extensive in the auricle. The gonococci are found in the sections in considerable numbers. They were most numerous in the most acute focus in the auricle. They were found also in the ventricle, but in much smaller numbers. In the pericardium very few were found. In the left auricle they were present in some of the sections in enormous numbers. In places almost every pus cell contained them. None were found in the tissue outside of the cells.

Sections of both knee-joints were examined after the tissue was hardened in alcohol. On the surface corresponding to the opaque appearance noticed at the autopsy there is an area of purulent infiltration extending only a short distance into the tissue—not more than one millimeter. In this tissue the vessels were dilated and tortuous and frequently contained numerous pus cells. In the tissue beneath there are comparatively few pus cells. Most of the cells here are large and swollen, conforming to the general type of the epithelioid cells and frequently containing large vacuoles within them. The surface of the joint is generally smooth, but in places it shows small depressions. The gonococci were found in but comparatively small numbers. They were never found deep down in the tissue, but were always either immediately on the surface or in the most superficial layers. They are most numerous where there are slight depressions and where the inflammatory process appears to be most intense. They were only found in the cells, and in their general character they agree with those found in the urethra.

When we look over this case we see that we have an acute gonorrhœa associated with remote lesions. These lesions appeared some time after the beginning of the attack of gonorrhœa, and in their general character they do not correspond with the lesions which are produced by the pus organisms. The process in the pericardium is not at all similar to any of the forms of peri- or myocarditis which are produced by other organisms. The most striking feature is the absence of any fibrinous exudation. The process consists in the production of various degenerations of tissue and necrosis with purulent infiltration, and a more or

less extensive reaction on the part of the tissue shown in the formation of granulation tissue. In the knee-joint, also, the process is a peculiar one. There is a comparatively slight extent of distinct purulent infiltration, but the main thing is a formation of granulation tissue with mucoid degeneration of the cells. The presence of this mucus coming from the cells gives to the purulent accumulation in the joint its viscid and gelatinous character. Our conception of the process in the urethra agrees almost exactly with that of the study which Bumm made on the conjunctiva. The process, as far as the bacteria are concerned, is a distinctly superficial one. There is more or less loss of the epithelium, with purulent infiltration. In the surrounding connective tissue there is an extensive formation of granulation tissue. No gonococci were found in the depths of the tissue.

As we said in the beginning, there are two opinions regarding the secondary lesions in gonorrhœa. One, that they are due to a mixed infection, probably to other organisms than the gonococci entering the system from the lesions in the urethra; the other, that they are due to a direct metastasis of the gonococci. From the examination of this case, I think there is but little doubt that the secondary lesions were produced by the gonococci, the same organism found in the urethra. Unfortunately the case is not a complete one, owing to the absence of cultures at the time of the autopsy. The organisms were only studied on the cover-slip preparations and in the sections. The sections show apparently the same organisms in the tissues as were found in the mucous membrane of the urethra. It is not possible to absolutely distinguish the gonococci from the pus organisms by their morphology alone. Streptococci are often found in pus cells arranged in pairs and resembling in almost all respects in their morphology the gonococci. They are not, however, as a rule, found in groups of four, as the gonococci frequently are. We can judge somewhat by their reaction with staining agents. All of the pus organisms retain their color after staining by the Gram method. The organisms found in this case were all decolorized. Although the pus organisms are frequently found in cells, this is not their exclusive position. In any case where they are found in the cells they will be found in the tissue also. The organisms found in this case conform with the gonococci, in that they were all decolorized by the Gram staining and were only found in the cells. Moreover, the lesions which were produced were not such as we would expect to be produced by the pus organisms or even by the pneumococci. Clinically the course of the disease, especially the absence of fever, which almost all observers have noted as characteristic of the secondary gonorrhœal affections, also speaks in favor of a gonorrhœal instead of a purulent infection.

ON SOME POINTS OF IMPORTANCE IN THE NOSOLOGY, PATHOLOGY, AND TREATMENT OF CANCERS.

By Herbert Snow, M.D. (Lond.), etc.,
surgeon to the cancer hospital, brompton.

It is the purpose of this paper briefly to discuss certain points of fallacy in the current nomenclature of malignant diseases, and to suggest a more precise definition of the leading terms. These obscurities of diction, with the not infrequent use of an identical word by different authors in extremely varying senses, often involve rather serious errors in practice. Moreover, the generic designation "cancer" covers a very extensive series of lesions; and it seems to the present writer eminently desirable that the natural complexity of the subject should be as little as possible enhanced by verbal or technical ambiguities.

I. Definition of Cancer.—Cancer, or "malignant disease," is the term denoting a large group of lesions in which cells normal to the body, or having previously constituted an integral part thereof, seem to acquire autositic properties; and thenceforward flourish, at the expense of the healthy tissues with which they come in contact.

Whether the autositic theory of cancer-formation be accepted or rejected, it can hardly be disputed that the above proposition accurately summarizes the very varied phenomena of malignancy. To it the clinical and pathological features of every neoplasm properly styled "malignant" accurately conform; while each differs from all the rest in comparatively minor matters of detail. All are saliently distinguished by the exuberant proliferation of previously normal cells; by the subsequent *progressive erosion* of contiguous tissues; by the acquisition of *infective* properties, with metastatic transference of cells or cell-particles to distant parts, there continuing to grow with the same peculiarities of function, and even with the same minutiæ of relative arrangement as the parent-cells. Most again exhibit, at one time or another, the phenomenon of "auto-inoculation;" much more common than is usually supposed. Many examples, some of routine occurrence, some exceptional, will be found in my recently published *Cancers and the Cancer Process.*

II. Principles of Natural Classification.—The primary *genera* of cancer will, on the basis of natural affinities, be referred to the functional or structural characters of the particular cell-variety whence each is derived; the secondary *species*, to modifications in the preceding, often associated with individual idiosyncrasy. Thus nine general demand recognition:

a. Epithelioma: derived from epithelial or epidermic cells, lining skin, or mucous membrane.

b. Carcinoma: from the secreting cells of acinar glands.

c. Sarcoma: from connective-tissue cell-elements.

d. Lympho-carcinoma: from the cells of the lymph glands, with other lymphoid or "adenoid" tissues.

e. Cylindroma: from the cells lining tubular gland follicles. A form special to the stomach and intestines.

f. Rodent ulcer: from the cells constituting the outer root-sheath of short hair follicles.

g. Endothelioma: the rare cancer of serous membranes.

h. Myo sarcoma: from the nuclei of non-striped muscle.

i. Blastoma: the cancer of fœtal residua. (From *βλαστὸς*, germ.)

Then of species, we have acute and chronic varieties of carcinoma, the latter being almost restricted to the female mamma; ditto of sarcoma, the spindle-celled and the mixed-celled; sarcomata whereof the parenchyma has undergone mucoid degeneration (myxoma); carcinomata, or not seldom cylindromata, subjected to an analogous process of decay, thus "colloid cancer;" sarcomata, partly organized into bone, constituting osteoid sarcoma; ditto, having undergone degeneration into a yellowish-green material (chloroma); melanotic cancer; glioma. We have further to add tumors on the borderland, as it were, of cancer, and but occasionally displaying malignant features; with others, peculiarly rare and obscure. Such are "thyroid cancer;" cheloid; Kaposi's disease (*xeroderma pigmentosum*); Dühring's neoplasm (*granuloma fungoides*); rhabdo-myoma; psammoma; the plexiform sarcoma of Billroth; intra-cystic vegetations of two species, carcinomatous and sarcomatous. This arrangement is, of course, but provisional, and will eventually be found susceptible of much further curtailment, with material advantage in point of lucidity. Several of the last-mentioned lesions in particular belong properly to the congenital group.

III. Some Ambiguities in Current Nomenclature, with their Practical Import.—The word "sarcoma" has acquired in medical parlance a significance almost as vague as the obsolete phrase "soft cancer;" as now employed, it designates almost any cell-mass, of uncertain starting-point—in addition to tumors arising in connective tissue. It is thus made to include examples of carcinoma, of lympho-carcinoma, of fœtal "blastoma," even of endothelioma.

If we restrict it to cancer-products of the connective tissues we must first ask how these are to be recognized. The distinguishing badge of the true sarcoma is the presence in microscopic sections of embryonic spindle-shaped cells, ranged in bands. The chronic sarcoma consists wholly of this tissue; the more acute and rapidly growing tumor presents microscopically the same pathognomonic feature blended with a variable amount of round or ovoid cells or nuclei. No sarcoma, properly so entitled, is without this distinguishing mark.

The omission from text-books of tumors designated as "round-celled

sarcoma" would be a distinct gain to pathology; the cases are either examples of "mixed" sarcoma, or else fall more correctly into some other division of the cancers. It would also be advantageous to relinquish the phrase "myeloid" sarcoma. "Giant corpuscles" or "myeloids" are little fibrinous masses entangling leucocytes; they are not restricted to malignant tumors, and those which possess them do not clinically differ from ordinary spindle sarcoma. They are common to tuberculosis, to processes of absorption or of repair in bone, as well as to sarcomata; I have even found them well marked in a very vascular breast carcinoma. Their presence seems only to imply marked vascularity; it is almost needless to state that they bear no relation to the marrow.

The true sarcomata differ from carcinomata, and from the other cancerous growths of epithelium, simple or functionally modified, in that they do not infect the nearest chain of lymph glands, *per* the lymphatic vessels, but only by the blood current. In other words, whenever we find obvious lymph-gland enlargement near a true sarcoma, that is a symptom of general blood-infection, with malignant cell particles circulating throughout the body, and is concurrent with other metastatic deposits in the viscera, etc. Such is the almost universal rule; it is possible that rare exceptions may occur; but cases in proof are wanting, and I have never encountered one. In clinical experience the distinction is illustrated by the two varieties of melanotic cancer. That which attacks the integument, as first pointed out by the writer (*Lancet*, October 15, 1892), is a product of epithelium developed from the pigmented cells of the Malpighian rete. This produces very early deposit in the proximal lymph glands. On the other hand, melanotic tumors of the eyeball arise in connective-tissue structures, do not infect the glands until late, and until there are conspicuous metastases in the liver or bones. (Pemberton, *Observations on Cancer*, Part I.)

Hence springs the important practical consideration that, with a true sarcoma, the adjoining lymph glands, when not enlarged, should on no account be interfered with at a surgical operation; and that, if these have undergone increase in bulk, operative removal will be practically useless. On the other hand, with carcinomata and epitheliomata, the cardinal principle of cancer surgery, on which, more than aught else, its future improvement would seem to depend, is *the excision of all lymph glands near the primary lesion, before any palpable enlargement has taken place.* For example, when a carcinomatous mamma is removed, unless for very transient palliation, it is imperative to evacuate the contents of the adjoining axilla. Should the tumor prove sarcomatous, a fact generally apparent to the naked eye by the yellowish color and fibrillated aspect of the cut section, interference with the axilla will very needlessly enhance the gravity of the operation. The more acute forms

of carcinoma here are ashy-gray in color, pulpy in consistence; under the microscope they exhibit little acinar arrangement, except at the margins; only a promiscuous mass of roundish cells is seen; and hence the disease very frequently passes as a "round-celled sarcoma."

Another point of fallacy, of less important practical, but of some pathological, significance, is connected with malignant new-growths of epithelium (epithelioma). We occasionally read of a "columnar-celled epithelioma," as distinguished from the corresponding product of squamous cells; and the term "duct cancer" has been coined to denote cases of mammary carcinoma, in which columnar epithelium lining cysts or the wide meshes of a stroma is a predominant feature, and which therefore are supposed to arise in the columnar lining of the lactiferous ducts. Now the particular shape of an epithelial cell is a non-essential and highly variable attribute. The transitional epithelium of the bladder materially differs in outward form with the degree of distention; piles and uterine polypi are coated by squamous cells in place of the normal columnar; the lining of the bronchial tubes is readily modified by conditions of the environment. For other facts in proof, see Bland Sutton (*Dermoids*, pp. 29, 30); Shattock (*Pathological Transactions*, xiv. 209); Haycraft and Carlier's "Researches on the Cat's Trachea" (*Quarterly Journal of Microscopical Science*, February, 1890).

Hence, a differentiation of the cancer-products of epithelium, based solely upon morphological considerations, proves unsound. Epithelial cells lining a mucous surface, whatever their previous form—squamous, cubical, columnar, or transitional—generate a malignant lesion with identical microscopic and clinical features. We have no evidence that the cubical cells lining lactiferous ducts produce any special variety of carcinoma; and the appearances regarded as distinctive of "duct cancer" are commonly associated with those of ordinary scirrhus. The somewhat rare "columnar epitheliomata" of the pharyngeal region, etc., are generally traceable to a congenital source (blastoma); are often encapsuled, or blended with cysts, and present, moreover, a more favorable outlook, in respect of surgical treatment, than the infective and rapidly infiltrating epithelioma proper.

That virulent species of cancer which primarily attacks the lymph glands I much prefer to entitle "Lympho-carcinoma" than "Lympho-sarcoma," for reasons sufficiently obvious to all who are clinically familiar with its course.

It necessitates very early recognition and prompt surgical treatment, neither of which presents, as a rule, much difficulty. A suitable appreciation of its character is, however, hindered by confusion with Hodgkin's disease, a general blood disorder following exposure to cold and wet, pyrexial, and simultaneously affecting many glands; whereas the malignant disease is primarily local, of traumatic origin, non-pyrexial, always

first developed in a single organ or contiguous group thereof. Both of these widely different maladies have hitherto passed often as "Lymph-adenoma," and many instances of the cancerous have been described as "round-celled sarcoma."

The two forms of melanotic cancer have been already alluded to; the epithelial source of one involves the surgical axiom of anticipatory removal of all dangerous lymph glands in the path ordinarily pursued by the infection, and peculiarly accentuates its significance. For the primary integumental lesion is always an insignificant wart or nævus, permanently eradicated with little trouble, and which, from any share it has in killing the patient, might almost as well have been left alone.

Life is destroyed by "recurrence," usually swift, in the glands, with the consequent eventual passage of particles of cancerous protoplasm into the circulation current. A spurious form of melanosis, not showing pigment, however, under the microscope, may be generated in a malignant tumor by extreme hyperæmia with extravasation, and visceral deposits of true melanotic cancer may be consecutive to some minute warty growth, previously removed and forgotten. But it is pathologically important to recognize the rule that this variety, whether epithelioid or sarcomatous, can be developed from pigmented cells only, and in regions of the body where such abound.

The term "Glioma" covers at least three distinct species of neoplasm, two of which appear in adults, while the third is peculiar to young children. Of the former, one is composed of minute spindle-shaped cells, arises from the neuroglia, and is a true sarcoma; the second, round or oval-celled, as originally pointed out by Virchow, arises in the ganglion cells, and not from the connective tissue. Both these tumors are found in the brain or spinal cord of people advanced in life. The third is restricted to the eyeball, may begin *in utero*, may attack both eyes synchronously, and is plainly of congenital origin, always developed before the thirteenth year, hence should properly be referred to the Blastoma series.

The myo-sarcomata, so far, have been reported mainly in association with the uterus, and have not been differentiated from the congenital rhabdo-myomata of the kidney, described under the same name. Microscopically, they consist of two diverse elements, predominant in different regions of the growth; one, of embryonic spindle cells indistinguishable from those of spindle sarcoma; the other, of small round "lymphoid" cells or nuclei. A typical instance is elaborately reported by Dr. David Finlay, in the *Path. Trans.*, xxxiv. 177; see also *ibid.*, viii. 287, and ix. 327. Many examples have been consecutive to an ordinary myoma of many years' duration. The fact is significant as illustrating the reversionary transition of benign neoplasms to cancer, and the variable line of demarcation between the two great classes of tumor forma-

tions, the innocent and the malignant. The same principle is more familiarly exemplified by new-growths in the female mamma, all of which, down to the most simple cyst, after the age of thirty-eight years, sooner or later become associated with the symptoms of malignancy, and for purposes of treatment, should then always be regarded as potential cancers. Many lives would be saved by timely removal of what the patient has been told is "only a cyst," before intra-cystic vegetations, carcinomatous or composed of embryonic connective tissue, have been suffered to sprout from its walls, or, what is far more dangerous, before carcinoma has attacked the gland acini imbedded in these or immediately contiguous thereto.

Considerations of space necessarily forbid discussion of remaining cancerous or quasi-cancerous lesions above tabulated. But it is impossible to omit reference to the growth of tumors which are the offspring of fœtal residua, of non-obliterated remnants of one or other of the embryonic "blasts," or of degenerate fœtal organs. Both clinically and pathologically, these very materially differ from the ordinary malignant developments of the "cancer age;" clinically, in generally attacking children and adolescents, as also in appearing spontaneously without discernible exciting cause; pathologically, in their tendency to cyst-formation, and in their strange admixture of the most dissimilar tissues. They cannot be classed with any malignant growth of the ordinary species. Sarcoma structure is curiously blended with that of carcinoma, both with cysts; thyroid tissue, Lieberkühn's crypts, cartilage, bone, fat, striped and non-striped muscle, ganglion cells, etc., are heterogeneously mixed. Hence, it appears necessary to place them in a division apart, which I have ventured to designate "Blastoma." This includes the "oöphoromata" of Bland Sutton (dermoid cysts of the ovary, which emit metastases, and are accompanied by various other cancerous features); renal "rhabdo-myomata," with malignant lesions in the genito-urinary tract of children; mediastinal tumors springing from the degenerate thymus; various mixed tumors in the parotid and other salivary glands, in the soft palate and pharynx; retinal glioma; many anomalous lesions about the nerve centres, etc. A more detailed analysis of these obscure forms will be found in my work above referred to. I believe that, collectively considered, their phenomena will be found to have a vital bearing upon the problem of cancer etiology in general. But whether that view meets or not with acceptance, it is clear that they must be clearly distinguished from the ordinary cancerous diseases of adult life, following well-recognized antecedents, and never developed without adequate "exciting cause."

THE DISORDERS OF THE NERVOUS SYSTEM ASSOCIATED WITH THE CHANGE OF LIFE.

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During the fifth decade of a woman's life she is subject to a group of peculiar symptoms. The cessation of the function of reproduction is an event second in importance only to the death of the individual. It is not strange that the loss of this wonderful power should be accompanied by changes in the mental and emotional condition, and that the action of the entire nervous system, connected as it is with every organ of the body, should be profoundly disturbed. The women in whom the change of life occurs unaccompanied by disagreeable sensations and symptoms are in the minority. The object of this paper is to enumerate some of these symptoms, to discuss briefly their nature and origin, and to present some suggestions with reference to their preventiou, amelioration, and cure.

In ancient times it was commonly believed that menstruation was, at least in part, an excretory function; that with the menstrual blood some indefinite and unknown excrementitious substances were eliminated from the body; that retention of these waste products occurred when the function of menstruation was inadequately performed; and that such retention was productive of very serious results. This idea has been gradually abandoned by most men who use their intellects and are not abnormally credulous. It is now generally recognized that the absence of menstruation is often not only attended by no unfavorable results, but, on the contrary, is an important aid to the preservation and increase of the vital forces.

It might perhaps be not unnatural to suppose that, when menstruation finally ceased at the menopause, the failure of the periodical sanguineous flow to occur would result in the presence in the vascular system of an abnormal amount of blood, and that this would give rise to important disturbances of various organs. It will subsequently be shown that this is, at least, improbable, and that on the other hand a deficiency of blood, or of certain of its more important constituents, is frequently present at this period.

It may be premised that the average woman is exceedingly neglectful of her health. Her clothing is often insufficient, and so arranged as to produce positive injury to her body. Her food is unsuitable in character, improperly prepared, taken at irregular intervals and in insufficient quantity, and not properly digested. Tea and coffee are frequently used to excess. Work, both productive and unproductive, is carried on with little regard to the limits of her strength or the necessity for rest. The

excretory functions are, as far as possible, forgotten, and constipation becomes habitual.

Such disregard of the recognized laws of health, persisted in for forty years, predisposes to the occurrence of serious disorders. It is at the menopause that many women begin to pay the penalty for their long-continued negligence.

Furthermore, the period of life between the fortieth and fiftieth years is likely to be especially trying to the emotional faculties. The loss of aged parents, of brothers or sisters in the prime of life, of children just arriving at maturity, or of trusted and life-long friends—one or more of these bereavements is likely to befall one at this time. Frequently a succession of these sad events produces an almost overwhelming depression of spirits. Besides these great and more obvious trials, the ordinary cares, troubles, and worries of life weigh one down at this age with more than ordinary irresistibility, because then one begins to feel that the years of greatest activity and vigor have passed, that old age is approaching, and that if the expectations of youth have not already been in some measure fulfilled, they will not be likely to be realized in the future. These depressing events and conditions act as exciting causes of many disorders to which the woman has predisposed herself by years of careless living.

After she has been suffering for weeks, and perhaps for months or years, she is very likely to wander into a physician's office and tell him that she has malaria. There are, it is humiliating to confess, a good many doctors who will tell her gravely: "Yes; you have malaria. You must take plenty of quinine."

If you inquire carefully in regard to the clinical history of one of these patients, you will find that she suffers from more or less of the following symptoms: Indisposition for exertion, inability to work, forgetfulness, headache, dizziness, insomnia, flushes of heat followed by chilly sensations, sweating, palpitation, flatulence, abdominal distention, and constipation. On making further examination you will probably find that her heart and lungs show no evidence of any organic lesion, and that her flesh is flabby, her pulse soft, her tongue coated, and the conjunctivæ are pale. She may have considerable intercostal neuralgia and frequent backaches, and tender spots may be detected in her head, back, and chest. She also sometimes complains of swelling of the face, hands, and feet, which, however, is often not a real œdema.

A study of the clinical history of these cases, and a consideration of the inconstant and changeable character of the symptoms, is sufficient to convince one that they are not of organic origin; that they are not associated with any distinct pathological change in the nervous system, but that, on the other hand, they may occur in connection with a variety of different conditions.

In some cases a disordered digestion is the most important factor in the causation and perpetuation of these very distressing symptoms. The chief disturbance may be in the stomach. Then eructations of gas and flatulent distention of the stomach are frequently the most annoying and most important symptoms. Or, on the other hand, the intestines and the associated glands may be chiefly at fault, and the most marked symptoms obstinate constipation and flatulent distention of the abdomen. Not infrequently these two conditions are found coexisting in the same case. They may then give rise to, or be associated with, a number of other symptoms, the most common of which are headache, dizziness, palpitation, and dyspnœa.

In some cases anæmia is an important element. This may be associated with disturbances of digestion, either as cause or effect. If both exist each may intensify and aggravate the other. If anæmia is present the patient usually complains of headache, dizziness, and dyspnœa.

In other cases insomnia is a prominent feature. This also may be a result of pre-existing derangements of function of various organs, and in turn, when present, may aggravate other disorders.

Finally, in many cases there is a distinct and well-marked element of nervous exhaustion. This is frequently the starting-point of other disorders, and when they are fairly established is intensified by them.

In making the diagnosis of this condition one should be very careful to exclude the possibility of the existence of any organic disease. In many cases organic diseases are accompanied by symptoms which resemble those which have been described as of frequent occurrence in connection with those functional disorders of the nervous system which are the subject of this paper.

Careful exploration must be made of the chest—of the lungs, but more particularly of the heart, to which many patients think that their troubles are referable—in order to detect the possible presence of commencing or latent organic disease. Careful analysis of the urine should be made occasionally, in order that no organic change in the kidneys may escape notice. The temperature should be taken now and then, especially if the action of the heart is at all accelerated, so that no febrile disturbance may be overlooked. Naturally inquiry should be made as to the manner in which each organ of the body is performing its function, and any deviation from the normal must be carefully noted and duly considered in deciding upon a plan of treatment.

The prognosis of these disorders is rather uncertain on account of the variety of circumstances which influence their progress. Many patients are exceedingly dilatory in seeking medical advice for these troubles. Many are very negligent about following up the treatment which is prescribed, and some fail to receive proper treatment because their

physicians make an erroneous diagnosis, or do not understand what therapeutic measures are adapted to the case.

The natural tendency of these disorders is to persist for months and years. They do not, however, have any inherent tendency to terminate in death. With proper treatment their severity may be mitigated and their duration very much abbreviated. If the patient seeks advice early, is judiciously managed, and follows up the treatment conscientiously and persistently, the prognosis is good. Care must be exercised to remove, as far as possible, the conditions which permitted the development of the symptoms in the first place, lest they return again after treatment has been discontinued.

In the management of these cases it is necessary to combine very careful hygienic regimen with appropriate medicinal treatment. Worry and care must be avoided as far as possible. Regular and prolonged rest must be secured. A moderate amount of mental occupation during waking hours is useful. Abundance of fresh air and moderate exercise are essential. Food which can be easily digested, and which has been properly prepared, must be taken regularly and in sufficient quantity. It must be eaten slowly and chewed thoroughly, and time must be allowed for the process of digestion to become fairly established before the resumption of mental or physical exertion. Tea and coffee must be entirely abandoned, and abundance of milk and water must be taken. Bathing and rubbing influence very favorably the circulation and the processes of nutrition. The body must be properly protected, so as to maintain an equable degree of warmth throughout, care being taken to avoid the extremes of an excess or a deficiency of clothing.

If the functions of any organ are not properly performed, the treatment must be so directed as to restore and maintain the normal action.

The digestive organs are perhaps more frequently deranged than any others, and require most careful attention to secure a proper performance of their functions. Constipation, flatulence, and anorexia are the most common and the most important indications for treatment. If constipation exists alone, a pill of aloes and myrrh taken at night, and followed, if necessary, by another in the morning, will generally produce a pleasant effect. Another excellent pill under these circumstances is one containing one-fifth grain of aloin and one-sixtieth grain of sulphate of strychnine. Two or three of these may be taken at different times through the day, if one at night is not sufficient. The object to be aimed at is to secure one easy movement of the bowels each day, unaccompanied by nausea or griping, by means of small doses, repeated if necessary, of some not very irritating laxative.

If anorexia, constipation, and flatulence are all present, a bitter mixture will generally prove useful—a combination of nux vomica, cascara

sagrada, cardamom and gentian, with aromatics, is exceedingly valuable under these circumstances.

If anæmia is well marked, iron and arsenic are very useful. If there is no, or only slight, disturbance of the digestion, pills containing sulphate of iron with carbonate of potash, known as Blaud's pills, with the addition of arsenous acid, produce excellent results.

If constipation accompanies anæmia, a pill or capsule containing arsenous acid, aloes, nux vomica, and reduced iron may be advantageously prescribed.

If neuralgia is a prominent symptom, five-drop doses of fluid extract of gelsemium will give relief in many cases. In connection with gelsemium, or in place of it, benefit will often be obtained from the use of sulphate of quinine with extract of hyoscyamus.

If the nervous symptoms are not accompanied by derangement of the functions of other organs, or if they persist after proper attention has been paid to the regulation of these disorders, it is necessary to prescribe remedies which act more directly upon the nervous system. The most useful drugs of this class are bromide of sodium, phosphorus and its compounds, nux vomica, and arsenic.

The use of arsenic has been already mentioned in connection with the management of cases in which anæmia is an important factor. In the treatment of certain forms of anæmia it is of great value. But besides increasing the production of red blood-cells, it unquestionably possesses the power, also, of promoting the nutrition and vigor of the nervous system. In combination with iron and nux vomica it is exceedingly useful.

The utility of phosphorus as a nerve tonic has long been recognized. A combination in pill form of one one-hundredth grain of phosphorus with one-quarter grain of extract of nux vomica has been used extensively and with excellent effect. One great drawback to its use is the difficulty of securing pills which have been properly made and in which the original characteristics of the drugs have been retained.

Phosphide of zinc is frequently substituted for phosphorus. One-tenth grain of this compound with one-fourth grain of extract of nux vomica will often prove of benefit.

The compound syrup of the hypophosphites is another preparation which is very popular with the profession, and which has positive value as a nerve tonic.

As a palliative agent, to produce sleep, to equalize the circulation, and to relieve the condition of nervous irritability commonly called nervousness, no drug is more useful than bromide of sodium. This salt is preferable to the other bromides because it is less unpleasant to take, and is less irritating to the stomach, while at the same time it is not inferior in therapeutic value. In prescribing this very valuable drug, one should never forget that it does not increase the strength or nutrition of the

nervous system. It should not, therefore, be relied upon for continuous prolonged administration to the exclusion of other remedies. On the contrary, its use should be supplemented by the administration of general tonics and of special nerve tonics. Iron and arsenic are especially well adapted for this purpose.

In conclusion the following propositions are presented:

1. At the time of life when the menopause occurs the various organs of a woman's body are likely to be in a state of depression as regards either their nutrition or functional activity, so that the normal equilibrium of healthy action may be easily disturbed, and abnormal action, the manifestation of disordered function, may be inaugurated and perpetuated.

2. The cessation of menstruation is an event of great physiological importance, and is perfectly competent to produce grave disturbances of the nervous system, if any predisposition to them already exists.

3. The more common disorders of the nervous system occurring under these circumstances are functional in character, and are associated with disturbances of functions of other organs, and especially of the digestive, circulatory, and hæmatopoietic systems.

4. In their treatment, attention should first be paid to improving the general nutrition of all the tissues of the body, and restoring each organ to its normal activity.

5. If, after all the other organs have resumed the proper performance of their functions, symptoms referable to a disordered condition of the nervous system still persist, recourse must be had to remedies which act directly upon the nervous system, either by improving its nutrition or by modifying and regulating its action.

THE FULL CORRECTION OF MYOPIA.[1]

By Edward Jackson, M.D.,
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Statistical studies of ametropia, the natural history of eye-strain and the behavior of emmetropic and ametropic eyes under the require, ments of our present social organization, all support the idea that the emmetropic eye is the ideal eye; that emmetropia is the standard toward which the evolution of the eye has proceeded. The mass of eyes present low hyperopia; that is, they approximate the emmetropic standard from

[1] Read before the American Ophthalmological Society.

the side of hyperopia—the safe side—and they approach it with remarkable nearness and accuracy. The ametropic eye is at a disadvantage. It has to sustain itself and do its work under conditions to which the delicate balances of its actions and nutrition have not been adjusted by the process of evolution, and that under such conditions those balances are destroyed and disease results is not to be wondered at. Further, all statistics of the refraction of the eye in childhood or in races living under primitive conditions, as well as the known requirements of human life up to the late generations of civilized man, indicate that of all forms of ametropia the one to which the conditions of nutrition are least likely to be adapted is myopia.

This proposition is supported by all clinical observation. The myopic eye almost invariably presents the evidence of such destruction of the balance of the nutritive processes as constitutes organic disease of its nutritive coat, the choroid. Of the intimate connection of myopia and choroidal disease there is no question, and without asserting that the myopia is always cause and the choroidal lesions effect, it must be admitted that to a considerable extent and in all the more advanced cases such a relation does exist.

In view of these facts, it would seem rational that when an eye is found working under the disadvantages of myopia it should at once be placed under the same favorable conditions as the emmetropic eye—that its myopia should be fully corrected and the correcting lens constantly worn, except at such time and to such extent as the emmetropic eye would require the aid of convex lenses for presbyopia. This is, I believe, the proper attitude to take toward myopia. Such a line of treatment should be followed except where it is clearly and definitely contra-indicated in one of the ways to be referred to hereafter.

It is, however, certain that on the part of a considerable number of ophthalmologists there is a disposition to avoid the giving of a full correction for myopia, or a timidity about it that keeps them from giving such lenses for constant use, or induces the advice to use the glasses as little as possible. This timidity is abundantly evidenced in ophthalmic literature and in the practice of colleagues, and was formerly largely shared by myself. It is to aid in showing that such timidity is mistaken and harmful that I bring forward a portion of my clinical experience in this matter.

The following are notes of all the cases in private practice remaining under my observation for three years or upward after they commenced the constant wearing of the concave lenses, fully correcting their myopia or myopic astigmatism. The letters M. and F. indicate male and female. The age given is that at which the wearing of the full correction was commenced; and the occupations are those followed since putting on the glasses:

CASE I.—F., aged thirty-one years, a school-teacher, was ordered:
Right.—1.50 cyl. axis 180°. V. = 4/4.
Left.—0.75 cyl. axis 180°. V. = 4/4.
After wearing these for three years constantly, the refraction and acuteness of vision remained unchanged.

CASE II.—M., aged twenty four years, a bank clerk, was ordered:
Right.—1.75 sph. ⊖ — 0.37 cyl. axis 45°. V. = 4/3.
Left.—0.75 sph. ⊖ — 0.62 cyl. axis 30°. V. = 4/3 partly.
After three years, refraction and visual acuteness unchanged.

CASE III.—F., aged twenty-three years, doing housework, with reading and sewing, ordered:
Right.—5.50 sph. ⊖ — 1. cyl. axis 90°. V. = 4/8.
Left.—5.50 sph. ⊖ — 0.75 cyl. axis 135°. V. = 4/8.
After three years, refraction and visual acuteness unchanged.

CASE IV.—F., aged fifty-two years, librarian, was ordered:
Right.—15. D. sph. V. = 4/6.
Left.—14. D. sph. V. = 4/9.
Accommodation being entirely gone, she was ordered for near work: Right, 11. D., and left, 10. D. Previously she had worn 8. D. lenses for constant use, with a pair of 5. D. lenses in extra fronts which she occasionally added for clearer distant vision. After three years, refraction and visual acuteness remain unchanged, and the glasses have been in every way satisfactory.

CASE V.—F., aged forty-five years, housekeeping and reading, was ordered for constant use:
Right.—8. sph. ⊖ — 5. cyl. axis 25°. V. = 4/8 mostly.
Left.—8. sph. ⊖ — 11. D. cyl. axis 5°.
This was the full correction for the right eye, but the left eye required an additional 8. D. spherical, which gave vision = 4/12 mostly. She could not use the two eyes together satisfactorily, so the above was given, allowing her to use the right for distant, and the left for near, vision. After three years, refraction and visual acuteness remain unchanged.

CASE VI.—M., aged thirty-six years, clerk, was ordered:
Right.—2.25 sph. ⊖ — 1.25 cyl. axis 105°. V. = 4/4.
Left.—2.25 sph ⊖ — 1.25 cyl. axis 65°. V. = 4/4.
Three years' constant use of the glasses with hard eye-work leaves the eyes healthy, with refraction and visual acuteness unchanged.

CASE VII.—M., aged twenty-four years, architect, was ordered for constant use:
Right.—0.25 sph. ⊖ — 0.50 cyl. axis 115°. V. = 4/4.
Left.—0.25 sph. ⊖ — 0.25 cyl. axis 20°. V. = 4/4.
After three years the refraction and vision remain unchanged.

CASE VIII.—F., aged sixteen years, in school, was ordered:
Right.—0.50 cyl. axis 180°. V. = 4/4.
Left.—0.50 cyl. axis 180°. V. = 4/4.
Three and one-half years later the refractive condition and vision were as follows:
Right.—0.25 sph. ⊖ — 1.25 cyl. axis 180°. V. = 4/4.
Left.—0.50 sph. ⊖ — 0.75 cyl. axis 180°. V. = 4/4.

CASE IX.—F., aged fifty-six years, a teacher of Latin, in poor general health, was ordered:

Right.—5. sph. V. = 5/9.
Left.—6.50 sph. V. = 5/9.

These were used for distant vision, while for near work concave lenses three dioptres weaker were given. After four years, visual acuteness and refraction unchanged.

CASE X.—F., aged thirty-four years, housekeeping, was given for constant use:

Right.—0.75 sph. ⊖ — 3. cyl. axis 180°. V. = 4/8.
Left.—0.75 sph. V. = 4/4.

Four years later her correcting lenses and vision were as follows:

Right.—0.75 sph. ⊖ — 3.25 cyl. axis 170°. V. = 4/5.
Left.—0.50 sph. ⊖ — 0.50 cyl. axis 60°. V. = 4/4.

The improvement of vision in the right eye being doubtless of the kind that frequently occurs from the wearing of the correction for high astigmatism.

CASE XI.—M., aged fifty-six years, an actor, was ordered for distant vision:

Right.—1.25 sph. ⊖ — 1.50 cyl. axis 95°. V. = 4/4.
Left.—0.75 sph. ⊖ — 1.50 cyl. axis 75°. V. = 4/4.

Reading glasses were given allowing 2.75 D. spherical for presbyopia. After four years he is still using the same lenses with comfort, with acuteness of vision unchanged.

CASE XII.—F., aged twenty-seven years, housekeeping, was ordered for constant use:

Right.—0.75 cyl. axis 170°. V. = 4/3.
Left —1. cyl. axis 10°. V. = 4/3.

Four years later she was found to require the following:

Right.—0.75 sph. ⊖ + 1.25 cyl. axis 82°. V. = 4/3.
Left.—1. sph. ⊖ + 1.50 cyl. axis 90°. V. = 4/3.

The myopic meridian having remained unchanged, and the emmetropic meridian become notably hyperopic.

CASE XIII.—M., aged forty-eight years, editor, was given for distant vision:

Right.—3.50 sph. ⊖ — 0.62 cyl. axis 95°. V. = 4/3.
Left.—3. sph. ⊖ — 0.62 cyl. axis 70°. V. = 4/3.

For reading he was given glasses with three dioptres weaker sphericals, and after four and a half years requires the following correction.

Right.—3.50 sph. ⊖ — 0.87 cyl. axis 100°. V. = 4/3.
Left.—3.25 sph. ⊖ — 0.75 cyl. axis 75°. V. = 4/3.

Before coming under my care he had suffered from serious choroidal irritation, and his myopia had been to some extent progressive.

CASE XIV.—F., aged nineteen years, student and teacher; ordered for:

Right.—2.25 sph. ⊖ — 0.50 cyl. axis 5°. V. = 4/4.
Left.—2.50 sph. ⊖ — 0.25 cyl. axis 165°. V. = 4/4.

After five years she was found to require:

Right.—2.25 sph. ⊖ — 0.75 cyl. axis 15°. V. = 4/4.
Left.—2.50 sph ⊖ — 0.62 cyl. axis 165°. V. = 4/4.

CASE XV.—F., aged twelve years, in school, was brought to me for eye-strain. Under full mydriasis she was found to be emmetropic, with vision = 4/3 partly in each eye. With other measures she was given convex sphericals of 1. D. combined with prism 1° base in for use in reading and studying, and was entirely relieved. Two and one-half

years later she returned, and was found to require the following correction, which was prescribed and worn constantly:

Right.—0.50 sph. ⊂ — 0.25 cyl. axis 110°.

Left.—0.25 sph.

These for a time also relieved her, but two years later she required:

Right.—1.75 sph. ⊂ — 0.62 cyl. axis 110°.

Left.—1. sph. ⊂ — 0.25 cyl. axis 60°.

Vision has remained the same, and since the last change of glasses four years have elapsed without material change of refraction.

Case XVI.—M., aged sixteen years, student, ordered for constant use:

Right.—1.75 sph. ⊂ — 0.37 cyl. axis 80°. V. = 4/3.

Left.—1.75 sph. V. = 4/3.

This patient came with a very clear history of myopia recently progressive, and its course was immediately checked, although near work was continued as before. Two and one-half years later he was found to require:

Right.—2. sph. ⊂ — 0.37 cyl. axis 65°.

Left.—1.75 sph. ⊂ — 0.37 cyl. axis 80°.

Since then three years have elapsed without change of vision or refraction.

Case XVII.—F., aged eleven years, at school, required and was ordered:

Right.—6. sph. ⊂ — 0.50 cyl. axis 90°. V. = 4/5.

Left.—6. sph. V. = 4/5.

These have been worn constantly for five years without change of visual acuteness or refraction.

Case XVIII.—M., aged twenty-eight years, bookkeeper, was ordered:

Right.—1.25 sph. ⊂ — 0.50 cyl. axis 110°. V. = 4/3 partly.

Left.—1.25 sph. ⊂ — 0.75 cyl. axis 10°. V. = 4/3 partly.

For a little time he was given weaker sphericals, with the same cylindrical lenses for close work, but soon gave them up. After five years his refraction was:

Right.—1. sph. ⊂ — 0.37 cyl. axis 115°.

Left.—0.75 sph. ⊂ — 1.37 cyl. axis 5°.

Vision remained unchanged.

Case XIX.—F., aged fourteen years, in school, and subsequently teaching, ordered:

Right.—2.75 sph. V. = 4/4

Left.—1.50 ⊂ — 0.50 cyl. axis 35°. V. = 4/4

This patient came with history of increasing near-sightedness, for which she had been using for about a year concave 1.5 D. sphericals for distant vision. The disks were obscured by pink striated swellings, the neighboring retina swollen and hyperæmic, the choroids "fleecy," and the best obtainable vision = 4/6. After ten days' use of duboisine her vision had improved to that given above, the swelling and hyperæmia had subsided, and a narrow crescent of choroidal atrophy was visible at the temporal side of the disk. After this, with the constant use of the glasses, vision remained clear and satisfactory for several years. Then she noticed gradual failure of distant vision without other inconvenience, and at the end of six years was found to require:

Right.—4.50 sph.

Left.—3. sph. ⊂ — 0.37 cyl. axis 25°.

In two years that have elapsed since, there has been no change of refraction, and vision is as good as ever. During the whole period she has been engaged in work requiring exacting use of the eyes.

CASE XX.—M., aged forty-nine years, merchant, was given for distance:

Right.—0.50 sph. ◯ — 3.25 cyl. axis 33°. V. = 4/4 partly.
Left.—0.75 sph. ◯ — 4.25 cyl. axis 160°. V. = 4/4 partly.

And for near work 2. D. spherical was allowed for presbyopia. After six years his visual acuteness was unchanged, and he required the following correction:

Right.—3.50 cyl. axis 33°.
Left.—0.37 sph. ◯ — 4.50 cyl. axis 163°.

CASE XXI.—F., aged thirty-four years, bookkeeper, came for acquired myopia and difficulty of seeing with the left eye of a week's standing. She had a small partial central scotoma due to acute choroiditis. The latter yielded promptly to treatment, and she was ordered:

Right.—1.25 sph. ◯ — 0.50 cyl. axis 100°. V. = 4/4.
Left.—1. sph. ◯ — 0.25 cyl. axis 180°. V. = 4/4.

She was also given glasses with weaker sphericals for near work, which were used considerably from time to time but ultimately discarded. At the end of seven years she requires:

Right.—1. sph. ◯ — 0.87 cyl. axis 95°. V. = 4/3 partly.
Left.—0.87 sph. V. = 4/3 partly.

CASE XXII.—F., aged twenty-four years, art student, was ordered:

Right.—5. sph. ◯ — 1.25 cyl. axis 35°. V. = 4/8 partly.
Left.—3. sph. ◯ — 1.25 cyl. axis 140°. V. = 4/4.

She has worn these glasses constantly ever since; vision remains unchanged for distance. She states that "they meet every requirement," and that "the eyes never ache or give any trouble." But as they have not been recently tested it may be that in the seven years that have elapsed there may have been some change of the myopia.

CASE XXIII.—F., aged seventeen years, student, teacher, and journalist, was ordered:

Right.—3.75 sph. ◯ — 0.50 cyl. axis 105°. V. = 4/5.
Left.—4. sph. V. = 4/4.

After four years it was found that she required:

Right.—3.50 sph. ◯ — 0.75 cyl. axis 105°. V. = 4/3 partly.
Left.—3.50 sph. ◯ — 0.37 cyl. axis 150°. V. = 4/3 partly.

These glasses have now been worn four years; vision is unchanged, the eyes quite comfortable, and the fundus normal.

CASE XXIV.—F., aged fourteen years, student and teacher, with a clear history of progressive myopia, was ordered:

Right.—5.75 sph. ◯ — 1.50 cyl. axis 180°. V. = 4/6 partly.
Left.—5.75 sph. V. = 4/6.

After six years she returned with trouble with her eyes and the habit of looking obliquely through her glasses, and was found to require:

Right.—5.50 sph. ◯ — 2.25 cyl. axis 180°. V. = 4/6.
Left.—5.75 sph. ◯ — 0.87 cyl. axis 175°. V. = 4/4 partly.

These she has worn for two years without further change or trouble.

CASE XXV.—F., aged twenty-one years, housekeeping, a great reader, was ordered:

Right.—6. sph. V. = 4/6.
Left.—6. sph. V. = 4/6.

These were worn constantly for five years. Then a — 0.50 cyl. axis 180° was added to the left eye, and she continued to use them without any change of acuteness of vision or trouble with the eyes until her death, four years later.

CASE XXVI.—F., aged thirty-two years, music-teacher, had irregular astigmatism and increasing myopia, for which she had worn 3. D. sphericals. She was given for constant use:

Right.—3.75 sph. ◯ — 1.75 cyl. axis 110°. V. = 4/9.

Left.—5.25 sph. ◯ — 2. cyl. axis 70°. V. = 4/9.

These have been worn for nine years without change of visual acuteness or trouble of any kind with the eyes.

CASE XXVII.—M., aged seventeen years, student and bookkeeper, came with a history of myopia increasing for two or three years. He was ordered:

Right.—4.25 spherical. V. = 4/3 partly.

Left.—3.75 spherical. V. = 4/3 partly.

Three years later his eyes were still comfortable and acuteness of vision unchanged. But about eighteen months after that he returned with symptoms of eye-strain and imperfect distant vision. He was now found to require, and was ordered:

Right.—5.25 sph. ◯ — 0.25 cyl. axis 30°. V. = 4/3 mostly.

Left.—4.25 sph. ◯ — 0.50 cyl. axis 145°. V. = 4/3 mostly.

Two years later, after a period of profound anæmia and disturbance of general health, he returned, and was given the following correction:

Right.—5.50 sph. ◯ — 0.75 cyl. axis 60°. V. = 4/3 mostly.

Left.—5. sph. ◯ — 0.50 cyl. axis 120°. V. = 4/3 mostly.

Since then two years have elapsed without further change of refraction or evidence of disturbance of ocular nutrition.

A review of the above shows that of 27 cases, 19 exhibited no change in the amount of myopia of over one-quarter dioptre during the period that they were under observation, varying from three to nine years; that in five cases—VIII., XV., XIX., XXIV., and XXVII.—there was some increase of myopia; and that in three cases—XII., XX., and XXIII.—the myopia diminished. It is, however, of equal importance to observe that in no case was there any diminution of visual acuteness, that all cases of increase of myopia were between the ages of twelve and twenty-five years, and that *in every case the full correction of the myopia checked, at least temporarily, the progress of disease in the eye*, and gave relief from the symptoms of eye-strain which in a large proportion of cases brought the patient to seek professional aid.

In Cases IV., V., IX., XI., XIII., and XX., the patient having passed the age of forty-five, allowance had to be made for presbyopia; but, except for near work, the full correction was worn constantly, without increase of myopia or other unpleasant effect in any case.

The cases above reported are all that I have treated by the constant use of the full correction that have remained under observation three years or upward. In addition, I have had a considerably larger number that were under observation for shorter periods, in none of whom have

I reason to think there has since been increase of myopia or other unfavorable symptoms, although it is not unlikely that cases of such change may have occurred. The cases that might be considered unfavorable—those in which there was subsequent return of asthenopia and increase of myopia—are all included in the above series. I can furnish an equal number of unfavorable cases from a much smaller series treated by partial corrections before becoming satisfied of the superiority of the plan of full correction.

If clinical experience makes such favorable report of the plan of full correction, and I believe that my experience in this regard will not be found exceptional, it will be of interest to inquire why it has been regarded with doubt, or the practice directly opposed by so large a number of writers and practitioners. Apparently this attitude is due to a fear that use of the accommodation is likely to cause increase of myopia. This fear is readily recognized in the teachings of many ophthalmologists, as in this statement which Landolt (*Refraction and Accommodation of the Eye*, English edition, p. 490) emphasizes by printing in small capitals: "A myope must be prohibited from wearing a concave glass for any distance at which he can see clearly without accommodation."

It is taught that use of the accommodation tends to increase the intra-ocular tension. In support of this, reference is sometimes made to certain experiments upon the lower animals. But of these experiments, it is only needful here to remark that their results have, on the whole, been utterly contradictory, and that the conditions of experiment are so different from those of physiological accommodation as to make even definite and confirmed results inapplicable to the question under consideration.

Next there is adduced the phenomenon to which attention was first called by Graefe, that if during the ophthalmoscopic examination the patient were induced to make a strong effort of accommodation there was a visible increase in the pulsation of the retinal veins. The observation as to the occurrence of this increased pulsation is easily verified, and the most probable explanation of it is that of increased intra-ocular tension. But the inference that this increase of tension is due to the use of the accommodation is incorrect. No such exertion of the accommodation as is required to cause the increased pulsation is possible without increased innervation of the lateral recti muscles, if not actual convergence of the visual axes. And in view of the compressing effect that contraction of the recti muscles necessarily has on the globe, it is entirely gratuitous to attribute any accompanying change of tension to exertion of the accommodation. Furthermore, the pulsation occurs under similar effort in eyes in which the accommodation is completely paralyzed by a mydriatic.

Again, it is frequently stated that the power of accommodation is essentially less in myopic than in hyperopic and emmetropic eyes, and this statement is commonly supported by reference to alleged differences in the ciliary muscle in myopic and hyperopic eyes, and a plausible explanation of why we ought to expect the accommodative power to be less in myopes. As a matter of careful observation, I do not find any general or essential deficiency in the accommodative power of myopic eyes. And where at the first trial some deficiency is found, it rapidly disappears with the constant use of the correcting lenses.

The best reason for fearing harm from accommodative effort in myopia is found in our acquaintance with its disastrous effects in other forms of ametropia. The retinal and choroidal changes of eye-strain are constantly before our eyes, and they are, without doubt, often associated with undue effort of accommodation. But it should be remembered that for the accommodation, as for every other function, there is a normal activity as well as an abnormal one, there is use as distinguished from abuse, and that the one is probably as important a factor in sustaining the ocular health as the other is in developing disease.

In this connection let me submit this thought: It is probable that there is some method of physiological compensation for increased functional activity within the eyeball by an increased flow of nutritive and excretory fluids. Now, from what we know of the relation of the ciliary body to the intra-ocular nutritive supply, and its relation to the paths of outflow, it is extremely probable that the act of accommodation does exert a decided influence upon the nutrition of the eye, and that the exertion of the accommodation in some such manner as it is exerted in emmetropic or slightly hyperopic eyes is an important factor in sustaining the intra-ocular health. It is not unlikely that certain choroidal conditions, common to myopic eyes and those that are suffering from senile degeneration, are directly due to the absence of active accommodation.

Finally, those who do not practise the full correction of myopia feel confirmed in their position by the frequently injurious effects of partial corrections. They reason that if the wearing of a weak concave lens is disastrous, the wearing of a stronger one would be more disastrous. But in this they err, failing to appreciate that the wearing of a partial correction of myopia is necessarily more dangerous than the wearing of the full correction. The reason of this is that the myope with a partial correction, will, in the effort to see as well at a distance as possible, look obliquely through his glasses, and so get the effect of a tipped or obliquely placed lens. What this effect is has been well shown by Dr. G. Hay (*Transactions of the American Ophthalmological Society*, 1875, p. 319), by Dr. John Green (*ibid.* for 1890, p. 690), and by Pickering and Williams (*Proceedings of the Amer. Academy of Arts and Sciences*,

1874–75). In 1887 I called attention to the practical importance of this in a paper read before the Section on Ophthalmology of the American Medical Association (*Journal of the American Medical Association*, November 9, 1887), but it is still far from being so generally appreciated as its importance demands. This looking obliquely through his correcting lenses causes the myope to receive heterocentric or astigmatic pencils of rays, exposing him to all the dangers of uncorrected astigmatism, aggravated by the fact that with every movement of the head or eyes the amount of such astigmatic effect varies.

Of the conditions contra-indicating the constant use of the full correction for myopia, coexistent presbyopia has already been alluded to. Being universally recognized, no more need be said of it. But allied to it is the condition of a few younger patients doing large amounts of near work, who get along better, if myopes, with an under-correction, if hyperopes with an over-correction for near work, and who even though emmetropic are helped by convex glasses. Two of the patients in the above series were of this class, at least temporarily. Such cases may be suspected from their history, and certainly recognized by trial. But it must be emphasized that they are among myopes, as in other refractive conditions, quite rare.

A second contra-indication is such diminution of visual acuteness that perfect focussing of the rays falling on the retina is not appreciated. Here there remains no reason for giving the full correction, while to get the largest retinal image the weakest lens compatible with such vision as is attainable is indicated. Similar in effect is the condition reached by old myopes when, on account of long familiarity with them, they prefer the large, blurred images of uncorrected or partly corrected myopia, to the small, sharp image of full correction.

Another class of cases to which the full correction should not be given, the only class to which Landolt's dictum, above quoted, applies, is that in which binocular fusion has been partly or wholly given up in the interest of better monocular vision. If relative divergence is fully tolerated, the strain of convergence, which is one of the great indications for the use of the correcting lenses, no longer exists, but is liable to be excited consensually by efforts at accommodation. As this class includes many high myopes, its exception is an important one.

In this connection it should be mentioned that the inconvenience and even pain excited by the first attempts to wear strong correcting glasses are not a contra-indication to their continued use. These may be tempered to the impatience or skepticism of the patient by partial correction or interrupted use of the glasses; but they are of precisely the same significance as the cramp or soreness produced by any other unfamiliar exertion and co-ordination of muscular effort. They are always temporary, and usually trifling in comparison to the benefit soon realized from persisting in the effort.

THE CLINICAL HISTORY, NATURE, AND TREATMENT OF "MILK-SICKNESS."

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Influenced most probably by the scant and skeptical references to the disease contained in our text-books of medicine, I was at one time inclined to question whether or not there really existed such an affection as "milk-sickness." But residence for several years in a section where it has been known from the days of the earliest settlers, and where at the present time occasional cases, both in man and in the lower animals, are still met with, I have been made to realize from personal observation that there is a disease, distinct and separate from others, to which the term "milk-sickness" is perhaps as appropriately applicable as any other title (with our present knowledge of the subject) would be, especially since it does not, as do so many of our nosological terms, inculcate any false ideas relative to the etiology or pathology of the disorder named.

Clinical History.—The clinical history of milk-sickness will be considered in two parts—the first very briefly noting the symptoms and progress of the disease as it appears in the lower animals; the second treating more at length of the various manifestations of pathological action that mark the course of the disorder as met with in human beings.

The disease *in animals*, such as cattle, horses, sheep, or other of the domesticated animals, all of whom seem to be subject to the affection, has been termed "the slows" or "the trembles"; the latter term having, I believe, the sanction of greater general usage. This name, "the trembles," owes its origin to a peculiar and irregular twitching of the voluntary muscular system, resembling the freshly exposed muscles of a recently killed animal, and frequently compared to it, always exhibited by the various animals subject to the disease as soon as it has become well developed. And, though named from a symptom of the disorder only, it has at least the merit of not seeking to perpetuate some doubtful or perhaps fanciful notion as regards its pathology. Occurring in animals from which infection is most often conveyed to man—in cattle—the earlier indications or manifestations of "the trembles" are not specially significant. The individual members of the herd earliest affected are the unweaned calves, and their mothers the last; the former having two sources of possible infection, *i. e.*, the original source, whatever that may be, and the mother's milk also. The latter have, in common with the other members of the herd, the original source; but an additional safeguard, or safety-valve it might be termed, in the elimination of the *materies morbi* in the milk.

An animal infected with the poison of the disease becomes at first listless and indifferent, being more inclined to mope around with drooping head and listless eyes, and standing apart, alone, rather than associating with its fellows. At this time, as well as later on, it stoically refuses all food, but will frequently drink water with avidity. The hide looks rough and uneven. The skin is never preternaturally warm; if any variation from normal exists, it is usually colder. The bowels, as a rule, are obstinately constipated. If the affected animal be allowed to remain quiet in one place these symptoms may not be materially altered for two or three or even four or five days; but if the animal be forced to undergo exertion the characteristic "trembles" are speedily induced. The deleterious or even dangerous influence of forced exercise is not only shown at this stage of the disease, but even later on in its course, when violent exercise will speedily result in death. The promptness with which forced exertion brought out or developed the disease, when latent and giving no particular indications of its presence, is a fact long recognized in localities where the disease has been endemic, and one often taken advantage of by the stock-traders in pioneer days, when the disease was immeasurably more frequent than now, who, when negotiating for cattle, sheep, swine, or horses, would invariably include as a part of the bargain the privilege of driving the animals for a time, and then leaving out those showing evidence of the "trembles." With the onset of the trembling stage, in addition to the animal manifesting great thirst and the bowels continuing persistently constipated, there develop symptoms pointing to a profound degree of prostration and impairment of nervous power. The animal affected rapidly weakens, and generally lies down—in grave cases stretching itself at full length—and is now with the greatest difficulty induced to get up or to move about after rising. Should the animal now receive appropriate treatment—and in a few cases, though the latter are decidedly exceptional, without any treatment whatever—an improvement in the general condition takes place and recovery gradually ensues. In unmolested cases, and in a majority of all cases, the symptoms of profound prostration increase, and the animal lies at full length, with cool skin and colder extremities, all nasal secretion entirely suspended, eyes glossy and staring, with nictation slow and infrequent at first, and later entirely abolished; a severe blow or pricking or prodding the skin now fails to elicit any attention, and death gradually ensues.

In man the onset of milk-sickness is never sudden or violent. There are no severe afternoon headaches, no chilliness or rigors—in short, but few or none of the usual series of prodromata of severe or serious acute disease. The individual grows unaccountably weak on the slightest exertion, easily tires, is indisposed to exert himself even in the least degree, is apathetic and languid to an extent that no matter how energetic or

active he may naturally be, finds it impossible to arouse himself to his accustomed activity. Coincident with these changes in disposition, loss of appetite comes on, attended most usually from the very start with a marked repugnance to food and decided nausea. The tongue at this time is moist and covered with a soft white fur. In some cases where the patient remains quietly within doors, refraining from physical exertion, there is little or no further development of the disease for three or four, or sometimes even five or six days, but usually a much shorter space of time elapses before more pronounced symptoms are exhibited. There may be some degree of cephalalgia present now—generally there is not; the patient usually, in answer to this question, stating that his head feels quite comfortable. There is in most cases now a marked degree of thirst present, and water is drunk freely, but generally vomited immediately. The tongue is large, heavy, and flabby, being thickly coated with a dirty white fur, and the breath assumes a peculiarly offensive odor which, in many cases, it is claimed, has led to the detection of the disease before any trembling set in. This peculiarity in the odor of the expurged air —a sweetish foulness compared to the breath of an unweaned calf—is not easily described, but once observed it will be readily noted if present in subsequent cases of the disease. So much consideration is given to this peculiarity of the breath that many laymen and numerous physicians who have seen much of the disease confidently claim that even blindfolded or in the dark they could readily detect the disease. While not entirely prepared to vouch fully for the scientific accuracy or correctness of this claim, I must state that in the few cases of the disease it has been my pleasure to see there was a special odor about the expirations which I have not observed in any other disease, and which persisted during the course of the disease until convalescence had been established, being quite as marked after the tongue and mouth had been thoroughly scrubbed with antiseptic washes as before. The nausea is increased, and is usually extremely persistent, constituting, from the patient's standpoint, perhaps the most disagreeable feature of the disease. Vomiting occurs frequently, and is attended with very little immediate relief. The fluid expelled from the stomach most frequently has a slightly bluish color, and is not, as a rule, very abundant in quantity, many of the efforts at emesis being unattended with the ejection of any fluid whatever. Contrary to expectation, it is true that even where there is much retching there is rarely developed any tenderness in the epigastrium. Late in the course of fatal cases the vomiting ceases from sheer exhaustion, the nausea, loathing of food, and desire to vomit still continuing, and the futile effort made producing a peculiar sound heard now and then during expiration. Hiccough is frequently a source of much annoyance, especially in the latter stages of the disease. The abdomen is flat, apparently empty, and its walls flaccid. There seems to be a complete

suspension of all peristaltic activity, the bowels being obstinately constipated, though in exceptional cases it is claimed that diarrhœa may be present instead. The respirations are shallow, and at times in the course of the disease, increased slightly; the inspiratory effort is short and the expiration made with apparently some degree of effort, and prolonged, ending much of the time in severe cases in a low half-suppressed moan. The frequency of the cardiac action is not increased, as a rule; in the earlier and middle period of the disease it may be at times slowed, but in the profound prostration that ensues prior to death it is increased. its action is labored, and the larger arteries seem to be unusually well filled.

Marked abdominal aortic pulsation is present which through the flaccid and relaxed abdominal parietes is easily observed, being sometimes sufficiently strong to be noted with the eye by its elevating, with each pulsation of the heart, the patient's covering, and constitutes one of the characteristic symptoms of the disease. The radial pulse, while not increased in frequency, is always weak and compressible, in striking contrast to the marked fulness of the larger central arterial trunks. The urinary excretion is generally lessened until sometimes not more than six to eight ounces are excreted in the twenty-four hours; coincidently with the decline in quantity traces of albumin may be found. The skin is cool, dry, and feels harsh; no visible perspiration is present. The nose and extremities communicate a sensation of coldness when touched.

The temperature is never elevated; usually it is subnormal, ranging during the course of the disease, from 97° to 98° F. At times it may be even lower than 97° F., and a return to normal or, as not infrequently happens, a slight elevation of one or two degrees above normal occurs coincident with improvement in cases that recover. The low temperature range is in striking contrast to the feelings of the patient, who will complain of being very hot and desire to be fanned much of the time. Next to the nausea and gastric distress, this subjective sensation of heat is the source of greatest discomfort to the patient.

Generally speaking, the listless indifference shown by the lower animals during the course of the disease is also seen in man; calls for water and little covering, or frequently none at all, will often be the only desires expressed by a patient; his surroundings, friends, relatives, or the future concern him not. In very grave or fatal cases the patient sinks into a condition of semi-coma or coma. The respirations grow less frequent, and sighing and more shallow; the pulse quicker and feebler, the listless, wan look increases, winking is very slow and at infrequent intervals, the conjunctivæ becoming dry and the corneæ glassy. The patient may lie in this condition, apparently halting between life and death, for hours or even a whole day, and recovery, at times, take place, but usually the respirations grow shallower, the heart weaker, the coma

increases, and, quietly and without any struggle or semblance of pain, death ensues. Delirium is very rarely present in either fatal or non-fatal cases. The different stages of the disease insensibly glide into each other, and if there be such a thing as a well-defined crisis in milk-sickness it must be in very rare instances.

MORBID ANATOMY.—My observations on this line have been limited entirely to a few cases in the lower animals where a fatal result ensued. In each of these cases there were *macroscopically* visible evidences of internal congestions of variable extent, more especially of the abdominal viscera. In one instance (an unweaned calf, six weeks old, found dead, supposed to be from "trembles") there was intense congestion of the cerebral meninges and some effusion; the abdominal organs being very moderately congested. Lack of time and imperfect technique rendered the microscopic examinations made of tissue and secretion unsatisfactory to myself, and of no value to the profession.

ETIOLOGY AND PATHOLOGY.—There are perhaps very few affections that human beings are liable to, and do suffer from, about the nature of which there have been more conflicting theories suggested than about milk-sickness. And yet, in reference to it, there is perhaps a better excuse to be offered for the general ignorance of the profession than can be set forth as an apology for our ignorance concerning almost any other disease. The vast majority of all the cases of milk-sickness that have been observed by medical men were seen by our *confrères*, the pioneer doctors—a class of worthy gentlemen more wedded to deeds than words—men who, nobly as they bore the burdens of their day, were as a rule unfitted by training for the elucidation of the more intricate problems of pathology; hard-worked, and not possessing the leisure even when they had the requisite knowledge and inclination essential to conducting such an investigation—men who read little and wrote still less. And, as the irony of fate will have it, now that these sections of country are inhabited by medical gentlemen who would gladly, in the interest of science, strive to clear up the mystery enshrouding the disease, it has entirely disappeared, or only an occasional case is seen.

In striving to acquire some idea as to the etiological nature of milk-sickness, it is well to first note some important peculiarities as regards the action of the poisonous principle giving rise to the disease; for, while not knowing to a certainty the *exact* nature of the *materies morbi*, we are in possession of quite a number of interesting facts relative to its mode of action and the circumstances under which the infection of animals takes place. The morbific material is unquestionably specific in its nature, producing milk-sickness and no other disease; and it may be with equal truth asserted that milk-sickness never originates or develops without this specific poison being present. The disease never develops in old or thickly settled communities where the land has been denuded

of its primitive growth or cultivated for a short time. Of course, it is possible that persons living in such places might contract the disease from the use of the flesh products of animals brought from infected regions. The possibility of the occurrence of the affection in this way would suggest the advisability of physicians in cities remote from the haunts of the disease being familiar with its symptoms and course, for at the present time, when railways are branching out into all of the hitherto out-of-the-way places, possibly travellers might become infected and the disease develop far from the source whence the infection came. Again, another possible danger lies in animal flesh, and especially in dairy products shipped, from places where the disease exists in cattle, to distant markets.

The mere removal of the timber and shrubs from a piece of land and the letting in of the sunlight to contact with the soil in places where animals have been known to contract the disease, as repeated observations in this and other localities have shown, will in a short time effectually and permanently remove all possibility of their contracting the disease in that place again. Animals allowed to roam at will and graze over a piece of wooded land known to have been a source of infection to cattle at various times in the past, will not contract the "trembles" if driven in in the afternoon and not allowed to remain on the infected ground over night or while it is wet with dew. These facts, as well as numerous others which I have herein laid down with what may seem an appearance of dogmatism, have been largely matters of personal observation to me during seven years' residence in this county, which is quite a large one, containing an area of more than seven hundred square miles, more than six hundred of this being yet in primitive forest. It has a hardy, vigorous population of thirteen thousand. It is mountainous. It has a thin but very productive surface soil of a few inches in depth, resting on a deep layer of stiff red clay subsoil. Its altitude ranges from 2400 feet in the lowest valleys to quite 6000 at the tops of the highest mountain peaks. In this county there are at least nine or ten "coves," or small wooded valleys, yet in primitive forest, known to be infected places. These places, some of them definitely located by the accumulated experience of at least three preceding generations of people as containing perhaps only a few acres, or in some instances less, are usually kept carefully fenced in, and cattle, horses, sheep, etc., are prevented from feeding on them; or if allowed to range in woods where an infected region is known to exist, they are carefully looked after and driven in early and not allowed to graze again until the dew has well dried. In this way prophylaxis is usually successful, and the opportunities for the study of the disorder, either in man or in the lower animals, are of not very frequent occurrence. But occasionally cattle or other animals stray off, lying in the woods over night, and contract the disease, or, as I have

known to happen, some newcomer, skeptical of the stories about "the milk-sick," told and retold him by the natives (who never seem to tire of discussing the disorder, and who almost seem to feel a special proprietorship in it, as they have been told "the books say little or nothing about it"), grazes his cattle "where he pleases;" and cases of trembles in the stock, or if milch cows be in the herd, in persons who use the milk or butter, are shortly afterward seen.

The type of soil does not seem to have any special influence as determining whether or not a given piece of ground contains the poison of the disease or not. In like manner, identity of flora seems to exert no influence; for instance, it has been observed here that cattle of the same herd grazing in one field or in one pasture will not have the disease, while their fellows in another pasture, seemingly identical in soil and flora, will develop cases of "trembles." The disease occurs, as a rule, in the late summer or early autumn months. Cases have been noted, however, as occurring in the winter months in both cattle and human beings, and were attributed to the cattle being fed on imperfectly cured grass cut from wet, shady, and swampy ground, where the disease had been suspected to exist. The disease is most likely to occur in autumn, after a warm summer in which there has been a light rainfall. In seasons when the rainfall has been heavy it may even fail to develop at all, and is certainly, if active, less so than during or after a dry season.

Among the older theories entertained by those familiar with the disease was the ingestion of some unknown mineral poison, which, having an affinity for moisture emanated from the soil with the dew and adhering to the vegetation, was devoured by animals while grazing. Again, it was assumed to be due to a mineral substance emanating from the soil and, assuming a volatile form, was inhaled by animals. Still others held to the idea that it was some toxic plant ingested by animals grazing in certain places, the active principle being in part eliminated through the milk and also penetrating and rendering poisonous the animal's flesh. Marsh miasm and a polluted water supply have also been urged as being probable causes of milk-sickness. Most recently bacteria have been suggested as the exciting factors, and here, I believe, we are in a fair way to arrive at a correct knowledge of the true nature of the disease. The clinical history of the cases I have seen decidedly negative the idea of either mineral or vegetable poisoning, so also do well-known facts connected with the development of the disease. The marsh-miasmatists were very near the truth, if their theory had only been developed more fully. With the adoption of the theory of a bacterial origin for milk-sickness, we have a theory that is in all respects tenable, fully consistent with the known facts relative to the disease, as well as one that I believe susceptible of demonstration. If we regard the miasmatic or germ theory as proven for malarial fever, then we can most

readily adopt it as most rational of all theories for explaining the phenomena of milk-sickness, for in no other disease is there so complete a parallelism of facts corresponding to malarial disease as is found in the development and course of milk-sickness. Let us note some of these complementary characteristics, and see if they are not sufficiently convincing to warrant the belief that milk-sickness in man and the "trembles" in animals, while not malarial disease as we understand that term, is without doubt an analogous affection and one possessing an analogous etiology.

The normal habitat of malarial poison seems to be new, undeveloped, marshy, undrained lands. Remove these conditions, and the disease, if existing at all, is in a greatly modified form. Milk-sickness has invariably been associated in its causation with primitive conditions of soil and vegetation, and as invariably has disappeared on the development of the land. Malarial diseases have no definite or fixed duration, and are not communicable from the sick to the healthy. Milk-sickness, in like manner, has no positive duration or regular course, and cannot possibly be communicated to others like most specific fevers. Both are essentially irregular in type and characterized by variations in their clinical histories. An attack of malarial fever is said to render the individual more liable to another, and impresses upon the system a *tendency* to the disease, which is liable to show itself from time to time. So it is with milk-sickness, the recurrent tendency being marked, and in many of the cases for months afterward there is a disposition to an outcropping of some of the symptoms of the former trouble. Both leave this peculiar impress upon the system. Unarrested by treatment the course and duration of malarial fevers may be protracted and uncertain. So with milk-sickness, its course is very materially modified by the treatment. The cinchona preparations seem to exert a special and peculiar influence upon the course and the duration of malarial disease. In like manner it has been, wherever the disease has been known, a matter of universal observation as regards the peculiar and specific action of alcohol upon the course of milk-sickness. It is evident that the poison of milk-sickness, both in its history and its effects on the animal economy, bears a closer analogy to the poison of malarial fevers than to any other known morbific agency. The toxic principles originating the two diseases are, without doubt, two different organisms, but the striking analogies in their natural history are sufficiently close to warrant us in regarding them as generically allied, though specifically distinct.

As to the precise nature of the bacteria giving rise to "trembles," or milk-sickness, the investigations of Dr. J. Gardner, of Indiana (*Reports of the Bureau of Animal Industry*) on the blood of a heifer dying of "trembles," while not conclusive, are at least suggestive Thus, in the

microscopic field "were countless multitudes of actively moving bacteria that bore in size and behavior a striking resemblance to that form of bacteria known to naturalists as B. subtillissima. They seemed to cling to the blood-disks, to be between them, and some few within them. . . . . Some dogs ate of the flesh of the dead heifer; they, too, were attacked with 'trembles,' their blood showing the same form of bacteria." It has been a matter of some regret to me that I have not been able to substantiate the above in its entirety. However, my belief in the bacterial origin of the disease has in no wise been shaken, and it is my hope if any cases of the affection occur in this section this season, that with more perfect arrangements for conducting a thorough microscopic investigation I shall be able to add additional demonstration to the bacterial theory, which olone affers us a satisfactory solution of the much-discussed etiological question.

Diagnosis.—Locally here in the rural communities of western North Carolina, where occasional cases of milk-sickness are seen, it is most likely to be mistaken for cases of "mountain fever," "continued fever," or typhoid fever, as the greatly modified types of enteric fever met with here are variously termed. Gastro-enteritis and possibly some types of malarial fever (the latter, however, never being seen here as an indigenous disorder) notably pernicious malarial fever, might be mistaken for milk-sickness, and *vice versa*. From these maladies, however, the subnormal temperature, the flattened abdomen, with its lack of tenderness, the strongly-marked abdominal aortic pulsation, the peculiar odor of the expirations, even in the absence of cases of "trembles," in animals, ought to suffice to establish the diagnosis. In the sections here, where cases of milk-sickness do occur, it is very frequently suspected where it is not found to exist. The peculiar inhibition of the heat-production centres, manifesting itself clinically in a subnormal range of temperature, has impressed itself upon me as being a very important diagnostic point, and one but little, if at all, noted in the accounts of the disease which occasionally appeared in the provincial journals in the earlier half of this century. While, of course, this subnormal temperature is at times seen in cases of enteric fever, it is here the rare exception, while in "milk-sickness" it is the rule to which the exceptions are very rare.

Prognosis and Treatment.—Of all diseases the continuance of which seemingly tends intrinsically to a fatal termination in perhaps the majority of untreated cases, I know of none which in the main responds more readily to proper treatment, or in which the benefits of treatment skilfully applied, are more quickly apparent and more enduring in results than milk-sickness. Without needlessly occupying space in a recital of the various methods of the past, the treatment successfully pursued by myself and colleagues, who have nearly each season one or more cases

to treat, will be briefly set forth. There seems to exist in every case two important indications: to establish and promote secretion (elimination?), to strengthen and maintain the vital powers. Empirically, many old laymen now dead, or past their "threescore and ten," have in this mountain country, hemmed in and cut off from the balance of the world until recently (when railways were first built), where doctors were few and hard to get, learned to diagnose and to treat most cases of milk-sickness with an acumen which it pleases me to have this opportunity of recording, and of congratulating them upon. I have more than once "sat at the feet" of these Gamaliels, wise and sagacious though often unlettered as they were, and heard the recital of their experiences with the disease—experiences now forever ended, the disease being in most sections extinct, whilst in places where it is occasionally seen the Medical Practice Act and the plentifulness of doctors cause the latter to be sought. The treatment I first learned from these old men, and which I have found so very efficient in the cases it has been my fortune to meet with that I have seen no reason for substituting another, is to establish secretion by the free exhibition of mercurials, to be subsequently maintained with full doses of sulphate of magnesia, or preferably castor oil, and plenty of good whiskey or brandy—the latter, generally speaking, and more especially in severe cases, being preferable. With some minor variations in individual cases, the above treatment, simple and with a strong flavor of old-fashionedness about it, will fully meet the apparent necessities of cases of "milk-sickness" during the height of the disease. Later, during convalescence, tonics such as quinine, nux vomica, mineral acids, the hypophosphites, will prove of great value in restoring to healthy action the gastro-intestinal tract, which in many cases will demand more or less attention.

HÆMOLYMPH GLANDS.

By Heneage Gibbes, M.D.,
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In the *Quarterly Journal of Microscopical Science*, 1883, N. S., vol. xxiv., will be found a paper of mine on some structures lying between the renal artery and vein in the human subject. These small bodies consisted of minute ganglia, lymphatic glands, a small body having the structure of the supra-renal capsule, and some glandular bodies which somewhat resembled compound lymphatic glands, with

this difference, that instead of lymph circulating through them, there was a current of blood passing into what would be the lymph sinuses in a lymphatic gland, from vessels lying in the fibrous trabeculæ. I found these structures in three consecutive cases, and concluded that they were permanent. Other work intervened, and I did not at that time examine any more cases for these interesting structures.

In the *Lancet*, November 29, 1890, there appeared a paper by W. F. Robinson, a student of Edinburgh University, working under the direction of Dr. Russell, entitled "Prevertebral Hæmolymph Glands," giving a description of these glands in the sheep and bullock as well as in man, which accorded with that given by me in the paper alluded to above in every detail; and Dr. Russell was stated to have suggested the name hæmolymph glands, which I willingly accept, leaving out the prefix, which is superfluous. On seeing this paper, I wrote to Dr. Russell and sent him a reprint of my own; but as I received no answer from him I am unable to say whether he was aware of its existence.

The fact that my observations had been confirmed, and also the presence of these glands in the lower animals being determined, induced me to make further investigations into the subject, especially in various diseased conditions, to see if they were in any way affected.

I have removed all small structures lying in the connective tissue near the renal artery and vein in a number of cases, such as disease of the kidneys, chronic cystitis, stone in the bladder, general tuberculosis, and carcinoma. In all these cases I found these hæmolymph glands, generally more than one on each side. They varied greatly in size, but were similar in structure, and I found nothing to add to my previous description. In addition to these hæmolymph glands I found a number of others. In almost every case there was on each side a gland having precisely the same structure as a supra-renal capsule. They varied greatly in size, but in the larger ones the three zones were shown as perfectly as in the normal gland. In one case this gland measured half an inch across. There were also some small lymph glands of the regular type. In the connective tissue I found some very small nodules, which from their minuteness were difficult to dissect out. These on section were found to consist of large cells with a well-defined nucleus; in some there were only a few of these cells, in others there were thirty or forty in the section. In every case they were enclosed in a delicate capsule so fine that it could only be made out with difficulty. Some of these cells contained a number of brown pigment granules. What they are is not clear. They resemble nothing in nervous tissue with which I am familiar. They have evidently some function, as each collection has a definite blood-supply; further investigation may throw some light on this subject. In none of the cases examined did I find the supernumerary adrenals affected with disease. The hæmolymph glands showed acute inflamma-

tory changes in some instances, but the only cases in which there was actual structural change was in general tuberculosis. The tubercular tissue was well developed and giant cells were numerous, but the tubercle bacillus was absent. It seems to me that this may explain some obscure tubercular conditions, and for that reason is worthy of further investigation.

CLINICAL ASPECTS OF IMMUNITY.

By William Buckingham Canfield, A.M., M.D.,
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In view of the enormous amount of speculation as to the theory of immunity and protection from disease, it has seemed to me to be of some interest to inquire from a practical standpoint, not so much what this immunity is, but what its strength is, its duration after attacks of some of the infectious and contagious diseases, and whether we can find any facts in this study to guide us in the practice of medicine. Even the most ignorant know that of a given number of persons exposed to a contagious disease all are not equally liable to take it. Those who escape when exposed are said to have an immunity against this disease. This immunity may be innate or congenital, or acquired. This innate, or natural immunity, however, is rare; acquired immunity being much more frequent. The latter comes either from a previous attack of the disease, from a protective vaccination or inoculation against this disease, from a prolonged stay in an infected region (acclimation), or from an intra-uterine infection (variola). The object of this paper originally was to try to see if any facts could be reached as to the duration and strength of immunity from a given disease after any one of the conditions above stated; to see if second attacks occurred, and how often; and to bring out any other facts which might be of interest. The results of this undertaking are not in proportion to the work involved, and are chiefly what possibly many already know; they have, however, the advantage of being brought together under one head, and may lead to further investigation in the same direction.

Exactly defined, immunity is that condition of the body whereby it resists the development of infectious or morbid processes, while predisposition is the condition of the body which, by the stimulation of a very slight cause, renders it liable to the attacks of certain diseases, especially to those of hereditary character. Whether immunity is complete or not is a subject which seems not to be decided. It is a common, but

probably mistaken, belief among many that second, and even third, attacks are quite frequent. This belief is not borne out by most authorities. Immunity is strongest immediately after an attack of a disease, and begins to get weaker and weaker until a point is reached where a second attack *may* occur if the conditions are favorable. The duration of this period of protection is very variable in the different diseases, and from the authorities consulted I have been unable to lay down any fixed time for any one disease. It looks as if this protection at times went from parent to child. Fagge says it would be interesting to investigate to what extent differences in the severity of a specific disease, attacking various individuals under the same conditions in countries where it is always more or less prevalent, may depend upon whether one or both of the parents of the several patients had had the disease in childhood, or at least before the patients themselves were born. It might even happen, in the case of a malady which commonly affects adults, that successive generations should in turn succumb to it, in consequence of the continued absence of such an inherited protection. Some diseases, as Asiatic cholera, probably affect a community very much as fire burns over a parched district: it passes over and attacks all susceptible material, and then does not come again until new material has grown up. In this way susceptible persons are gradually weeded out, and in time an immunity is established.

Before looking at the different diseases it may be asked, "Do we have second attacks of the infectious diseases?" We most probably do, but they are not so common as is generally believed. One reason is because there is a great tendency to confuse a relapse with a recurrence. A relapse is a return of the disease before convalescence has been established, while a recurrence is a return of the disease long enough after the first attack to remove the suspicion of its being a relapse. Thus after an attack of acute pneumonia, and even long after the patient is apparently well, the diplococcus of the disease can be found in the contents of the expectoration, and this analogy would hold good in other diseases where the specific organism had not been eliminated from the body, and yet where recovery had apparently taken place. There is probably hardly a physician who could not report an account of a second, or perhaps of even a third, attack of one of the eruptive diseases; but the question is, "Are they really second or third attacks?"

It is undoubtedly true that the frequency of the occurrence of second attacks has been much exaggerated. There are, in the first place, errors of diagnosis, which occur to the busy man as well as to the more inexperienced practitioner; there are the drug eruptions and erythemas which simulate the ordinary exanthematous diseases; there are numerous cases in which the physician has seen but one of these supposed repeated attacks, but has taken the word of the parents or attendants for

the truth of it. Variola is one of the eruptive diseases which generally leaves a mark behind it, so that a careful eye can usually detect traces of it; but the other diseases of this kind (except chicken-pox) leave no mark, and hence it is much easier to assert that they recur, while we know that smallpox rarely occurs more than once. Gerhardt says the eruptive diseases may occasionally recur, especially when the first attack was slight.

To scarlet fever the most attention seems to have been given. Henoch, who is a man of wide and careful observation, is very skeptical as to second attacks of this disease; he says they are very rare, and adds that he has seen but one case of which he was certain. Flint says second attacks of scarlet fever are very rare. Whittaker also says second attacks of scarlet fever are very rare; one attack protects, as a rule. Busey, of Washington, has never seen a second attack of scarlet fever, but has seen repeated assertions of it. Chapin, of New York, with a large experience in children's diseases, says that second attacks almost never occur. Ayer reports three attacks of scarlet fever in the same boy—one attack at five, one at eleven, and one at eleven and one month, the latter looking to me very much like a relapse. He says he at first thought it was simply scarlatiniform erythema, and I think it very likely was. He says he believes in second attacks, but thinks they have so many forms that they are liable to deceive, and it seems to me that they have in this case deceived him. Trojanowsky reports 300 cases of scarlet fever, with 18 recurrences, or 6 per cent.; and of these, 260 were in children, with 15 recurrences, or 6 per cent., and 40 in adults, with 3 recurrences, or 7½ per cent. He believes that there are signs of recurrence being hereditary. In these 18 cases the intervals between the attacks were from six months to seven years. He also believes that recurrences are more common when the first attack was light or abortive.

The general opinion seems to be that measles recurs more frequently than scarlet fever. Trojanowsky and Eiselt report a large number of cases of measles with recurrences. Many attacks of rötheln, or German measles, have undoubtedly been called second attacks of measles, but Atkinson very properly argues that it is illogical to insist upon a diagnosis of rötheln in a doubtful case, because the patient has already passed through one attack of measles. Bartholow maintains that second attacks of measles are very rare, and some authorities say they have never seen second attacks of this disease.

Natural immunity to smallpox is less frequent than in the other eruptive diseases; certain persons are hereditarily refractory. One person in sixty among infants, and one in twenty in adults, are naturally immune against smallpox. Even with inoculation it is said to recur, while by vaccination it is more limited. The length of time a person is pro-

tected after vaccination is generally put down as from eight to ten years, but it certainly varies with the strength of the lymph used, and with the size and manner of the scarification, and other things. Some persons will take the disease when exposed, and yet will not take when vaccinated. History says that Louis XV. of France had smallpox when fourteen, and died from a second attack of it in his sixty-fourth year. Curschmann says that smallpox has recurred as often as five or six times in the same person. Flint says we know no law governing the duration of the protective influence of a single vaccination, and adds that we should be revaccinated every five years. This is probably too often, although Dr. James F. McShane, the Health Commissioner of Baltimore, informs me that this same interval of time is advocated by the Health Office of Baltimore. Layet says that immunity from smallpox by vaccination is transitory, and it is difficult to say how long one is protected. It varies according to the conditions above stated. It is better to let the intervals between the vaccinations be not longer than ten years. About one in every hundred is refractory. In children from six to ten years old, 40 per hundred were vaccinated successfully; 42 per hundred in children from seven to eight; 45.5 per hundred in children from eight to ten; and 44.5 per hundred in children from ten to twelve. At the age of military service, Titeca says that 60 per hundred, and Layet 75 per hundred, were successfully vaccinated. In Germany the statistics for all ages were 94 successful vaccinations per hundred, which seems almost incredible. Immunity wears off very rapidly when the body develops very rapidly and when there is much renewing of tissue; that is, during infancy and adolescence. The proportion of successful vaccinations after smallpox is 24 to 25 per hundred.

E. O. Shakespeare, of Philadelphia, who professes to know something about Asiatic cholera, says it may recur. He says that one attack of cholera confers upon the individual at least a short immunity from a second attack, and for the purposes of prophylaxis the value of this fact should not be underestimated. Other authorities on Asiatic cholera are not in exact accord with this opinion.

Second attacks of yellow fever are very rare, if they occur at all. They may recur when the first attack was early in life, or when the individual has moved out of the region where it is common and has returned to this region in after-life, thus losing the condition of acclimation. The negro race is particularly immune against yellow fever, just as it is particularly prone to smallpox.

Second attacks of typhoid and typhus fever are exceedingly rare.

Some diseases are more apt to recur when they have attacked once, and such are diphtheria, erysipelas, and the ordinary constitutional diseases. In the case of erysipelas, one attack makes the patient more liable to future attacks, but they are generally less severe.

There has always been a question as to whether one can have syphilis a second time, and on that point I have not been able to satisfy myself, for one author will assert that it can never recur, while another will bring apparently good proofs to the contrary. It, of course, in part hinges on the belief whether syphilis is ever cured or not. Taylor reports having seen four authenticated cases of recurrence of syphilis, and Diday has collected forty cases which he is sure are genuine recurrences. This, of course, is a very small number in proportion to the large number of cases which these men had seen. If these second attacks are genuine, it goes to show that syphilis has been and can be cured—a thing which many do not believe.

While not belonging properly to the subject, the question of the concurrence of diseases is interesting. Cases have been reported where two eruptive diseases have occurred at the same time in the same person. These statements must be accepted with grave doubt. Cases in which one disease makes its advent before another has quite faded away may occur, but they should not be confused with those cases of recrudescence in which the disease for some unknown reason returns or relapses just as it is passing away. That one disease may follow closely on another is certainly true. According to Henoch's statements, there seems to be a certain etiquette among the eruptive diseases, possibly due in part to the varying periods of incubation, so that with apparently simultaneous exposure to two diseases one would set in and finish or approach completion before the other would make its appearance. He noticed in his department in the Charité Hospital, at Berlin, that on exposure to two eruptive diseases the child would not take, say scarlet fever, until the first disease, say measles, had almost or altogether disappeared. That is, one disease stood aside until the first one had finished its course. This he observed frequently, and he attributed it to the imperfect condition of the children's ward, which did not sufficiently separate the different diseases.

In looking over the statements made in this paper in connection with the recurrence of certain diseases, it will be seen that it is largely made up of references to the literature. This was done with the object of finding some facts from which definite conclusions might be drawn. I have made the following inferences :

1. Second attacks are by no means so common as is generally supposed.

2. The more marked the signs and symptoms, and the more lasting the effects of the disease, the less often do we hear of second attacks. Measles and scarlet fever leave usually no marks, while smallpox leaves a scar: recurrence of the latter disease is less often claimed.

3. Those who insist on second attacks should assure themselves of the character of the first attack, and not take unreliable testimony.

4. When second attacks do occur, they generally come on long after the first attack, the individual is usually weakened in some way, and the attack is invited by the ingress of a larger number of organisms than would cause a first attack; while such conditions as fear, worry, fatigue, constipation, exposure, debauchery, etc., favor the second attack.

Bibliography.

Ziemssen: Encyclopædia.
Charcot-Bouchard-Brissaud: Traité de Médecine.
Trojanowsky: Dorpater medizinische Zeitschrift, 1872-73.
Buchner: Deutsche medizinische Zeitschrift, 1888.
Koerner, R.: Jahrb. f. Kinderheilk., 1876.
Huettenbrenner: Jahrb. f. Kinderheilk., 1877.
Ayer, J. B.: Boston Med. and Surg. Journ., 1887.
Henoch: Charité-Annalen, 1882; Vorles. über Kinderheilk., 1883.
Eulenberg: Realencyclopädie d. ges. Heilkunde.
Gerhardt: Handbuch d. Kinderheilk.; Lehrb. d. Kinderheilk., 1881.
Shakespeare: Report on Cholera in Europe and India, 1890.
Lang: Pathologie u. Therapie d. Syphilis.
Pepper: American Text-book of Medicine, vol. i., 1893.
Fagge: Practice of Medicine, 1886.
Flint: Practice of Medicine, 1873.
Bartholow: Practice of Medicine, 1881.
Keating: Cyclopædia of the Diseases of Children, 1889-90.
Hudélo: Annales de Dermatologie, 1891.
Loomis: Practical Medicine, 1889
Smith: Diseases of Children, 1890.
Gould: New Medical Dictionary, 1890.
Fowler: Dictionary of Practical Medicine, 1890.

REVIEWS.

A TEXT-BOOK OF MEDICINE FOR STUDENTS AND PRACTITIONERS. By DR. ADOLPH STRÜMPELL, Professor and Director of the Medical Clinique at Erlangen. Second American edition, translated by permission from the second and third, and thoroughly revised from the sixth German edition, by HERMAN F. VICKERY, A.B., M.D., and PHILIP COOMBS KNAPP, A.M., M.D., with editorial notes by FREDERICK C. SHATTUCK, A.M., M.D. With one hundred and nineteen illustrations. New York: D. Appleton & Co., 1893.

THE medical profession of this country, thanks to the labors of Drs. Vickery, Knapp, and Shattuck, are familiar with Strümpell's text-book and will gladly welcome this new and revised edition. There cannot be too many good books on any subject, and the merit of this one is attested by the fact that it has passed through six editions in Germany. The book has now expanded to 1043 pages. "There is an entirely new chapter on influenza, a disease which had almost been forgotten when the last great epidemic brought it prominently to medical attention. Quite important changes and additions have been made in the chapters on cholera, malaria, diseases of the nose and larynx, syringomyelia, and diabetes. The appendix on poisons has also been considerably enlarged."

One naturally turns to the newer material in order to ascertain how thoroughly the work is kept up to the times, and the result is by no means disappointing, provided the fact is kept in mind that the volume is pre-eminently what it claims to be—a text-book. It is a book much better adapted to the needs of the medical student than any of the ponderous compilations in which each chapter aims to be a complete treatise on the subject to which it is devoted. Monographs are for the post-graduate; text-books for the "student."

There are, doubtless, chapters in which the well-read practitioner would be glad to find more detail. For example, under the head of Pernicious Anæmia, no mention is made of the admirable contributions of Dr. William Hunter to the obscure pathogenesis of that disease. This is the more inexcusable because Hunter's researches must be admitted, even by those who do not accept his conclusions concerning the etiology of pernicious anæmia, to be of great value in *identifying* that affection. The presence of "pathological urobilin" in the urine and the iron-pigment zone in the hepatic acini are features peculiar to this disease, and the student should be made familiar with them.

The book is remarkably free from typographical errors. We would be inclined to regard the word "spirilli" as one of them, but for its frequent use in medical writings. In the next edition it is to be hoped that it will be changed to spirilla, which is the plural of the

modern Latin word spirillum. H. C. Wood is probably intended for C. Wood, on page 940, but we are inclined to question the statement that he was the first to call "attention to the fact that the bone-marrow is almost invariably affected in pernicious anæmia."

The work, as a whole, is excellent, and the few errors which it contains are so trivial as to make it perhaps hypercritical to allude to them. It resembles the work of the late Austin Flint more than any treatise now before the profession, but it is scarcely fair to make the comparison. Our reason for this statement is that Strümpell's *Text-book of Medicine* is a translation, and although the translators have admirably performed their arduous task, they must have been more or less hampered by the original arrangement of words and sentences. It is, therefore, we repeat, scarcely fair to compare a style which, from the nature of the case, must be more or less "labored," with the charming diction of Flint. Strümpell is, doubtless, in the original German what Flint has been, and, we trust, will again be, in English, a model text-book.

F. P. H.

HANDBOOK OF INSANITY FOR PRACTITIONERS AND STUDENTS. By DR. THEODOR KIRCHHOFF, Physician to the Schleswig Insane Asylum and Privatdocent at the University of Kiel. 8vo., pp. vi., 362, with eleven plates and eleven diagrams. New York: Wm. Wood & Co., 1893.

WE know of few treatises on insanity better adapted for the beginner than the work before us. It is both brief and clear, its descriptions of disease are good, its recommendations for treatment are sound, and it is not encumbered with confusing discussions on unessential and obscure points. The nameless translator has condensed the original work somewhat, and has been on the whole very successful in his efforts to put it into readable English.

Fully one-half the book is taken up by the general part. Some of this is hardly necessary. A consideration of the anatomy and physiology of the brain, condensed into a few pages, is out of place in a work of this character, nor is a history of psychiatry a useful addition. For such information the student should be referred to special works; he should know his anatomy and physiology, and be grounded in the elements of regional diagnosis, before he begins the study of insanity. The chapters on etiology, symptomatology, and the course of the different forms of diseases, however, are extremely well done. The chief defect in the work is the insufficient attention paid to pathology. Although metaphysical discussions are for the most part avoided, the author has evidently studied psychiatry from the metaphysical standpoint rather than from the standpoint of the anatomist. Thus he states that "anatomical changes are absent in the majority of cases," and that "mental diseases are not merely diseases of the brain, but diseases of the person." Except in idiocy and paretic dementia, we cannot, of course, determine the form of insanity from the post-mortem changes; but that insanity can exist without some morbid change in the brain is hardly to be believed, and we think it better for the student and more conducive to the advancement of our knowledge of mental disease to hold that position. Even in a treatise like this, the importance of the finer structural changes and

the possible significance of anomalies in development, such as abnormal fissuring, are worthy to be considered.

In the special part, which forms the second half of the book, the first thing which is of interest is the classification. This is extremely simple, and is based solely on the pathology. Forms of insanity without permanent anatomical change are called simple mental diseases—melancholia, mania, paranoia—while a second chapter treats of mental disorders associated with permanent anatomical changes in the brain, or with general diseases—the dementias, idiocy, epileptic and hysterical insanity, etc. Hebephrenia and insanity of doubt are dismissed with a word; katatonia receives no mention, and confusional insanity (acute Verwirrtheit) is regarded as merely a form of paranoia. Every classification is open to criticism, and the defects of this are obvious, but the most important ones are pointed out by the author himself, so that further criticism seems unnecessary. All classifications being defective, the essential thing is that the descriptions of the individual forms of insanity should be good enough to redeem the defects. In this the author has succeeded. Taking as crucial tests the chapters on paranoia and paretic dementia, the various morbid mental conditions are described in such a way as to give the student a definite comprehension of the patient's mental state. Many valuable suggestions, too, are made in regard to treatment, but, for the most part, home treatment is discouraged. To repeat what we have already said, the work is one to be heartily commended to all students of mental disease.

P. C. K.

REFORM IN TREATMENT OF THE INSANE. EARLY HISTORY OF "THE RETREAT," YORK: ITS OBJECT AND INFLUENCE; WITH A REPORT OF THE CELEBRATION OF ITS CENTENARY. By D. HACK TUKE, M.D., LL.D. Pp. 96. London: J. & A. Churchill, 1892.

THE interesting account given in this small volume of the famous York Retreat is commemorative of the noble work there done for the insane by the illustrious Tukes—William, Henry, and Samuel—to which number may fitly be added the name of the author, whose eminent talent has been of so much service to the cause of these unfortunates. Few events can be more deserving of commemoration than the birth of reform in the treatment of the insane, which has led to their humane care in all civilized countries, and this may be said to have practically taken place with the foundation of the York Retreat. Samuel Tuke's venture even ante-dated a little that of Pinel in France, and although the latter's sudden, complete, and daring removal of manacles, chains, and other forms of restraint at Bicêtre was more dramatic, it was not a whit more effective for the future amelioration of the lot of the insane than the quiet inception, through many struggles and no little obloquy, of the York Retreat. Moreover, while both reformers together inaugurated a new era in the care of these sufferers, the Tukes have been able to keep before the world for a century, by their labors at York and at large, a conspicuous example of the operation of an advanced method, contributing at the same time to the knowledge of its benefits by their writings and influence.

H. R. S.

A System of Genito-urinary Diseases, Syphilology, and Dermatology. By Various Authors. Edited by Prince A. Morrow, A.M., M.D. With illustrations. In three volumes. Vol. I. Genito-urinary Diseases. New York: D. Appleton & Co., 1893.

The first volume of this work is devoted to the consideration of Genito-urinary Diseases, and among the thirty-two authors who have made their contributions are to be found the names of some of the foremost of American specialists, writers, teachers, and operators. We are not, therefore, surprised to find the greater part of the book practical, instructive, and fully abreast of the times.

It is to be regretted that in some instances the writers, seemingly to condense the work, have abbreviated important subjects, so that much of practical value is eliminated.

The articles to which we especially refer are those devoted to the consideration of the Anatomy and Physiology of the Genito-urinary Organs, Abnormalities of the Penis, Hæmatocle, and Functional Disorders of the Male Sexual Organs. When considering the last-named subject the writer is very practical, but he is not sufficiently thorough to benefit the general practitioner, and he conveys but little information to the neophyte.

Dr. Morrow differs from many authorities in his method of treating spermatorrhœa when complicated with hyperæsthesia of the prostatic urethra. On page 1014 he advises the passage of the bougie "as large as the capacity of the urethra will permit; a congenitally small meatus to be divided if necessary to admit the passage of an instrument 20 to 30 French scale. They should be introduced *every other day*, and allowed to remain from *five* to *twenty* minutes."

We cannot agree with the writer; the experience of most surgeons teaches that when the patient first comes under treatment the instrument should not be passed more frequently than every third day, otherwise sensibility of the urethra will undoubtedly be increased; the bougie should be considerably smaller than the normal size of the canal, for the reason that if there be hyperæsthesia present even an instrument of small size must cause great pain. It should be at once removed after having been passed. As the sensibility of the canal diminishes the instrument is to be increased in size until the full calibre of the urethra has been reached, and at the same time the intervals between the passage of the bougie should be shortened, when it should be daily inserted. When hyperæsthesia begins to subside the instrument may be retained longer within the canal, the surgeon being guided by the amount of discomfort produced. Ultimately it may be allowed to remain for the space of twenty minutes.

We take exception to the arbitrary directions to enlarge the meatus "to admit the passage of an instrument 20 to 30 of the French scale" as being too indefinite and unsurgical. The operator must be guided by the normal calibre of the urethra, the size of which should be carefully ascertained before any operation is attempted.

The chapter on "Functional Disorders of Micturition" is very attractive and instructive, and the article on the "Diagnostic Significance of Pathological Modifications of the Urine" is a very valuable contribution

to the volume—treating as it does, of subjects not often discussed in works of this kind.

The "Diseases of the Prostate Gland" were very properly assigned to Dr. Belfield, the well-known authority upon this subject. The article is complete.

The chapter on "Diseases and Injuries of the Bladder," by Dr. George R. Fowler, is a very valuable contribution to the profession. The subject is well condensed and the article is full of information.

The chapter on "Cystoscopy" is useful, timely, and exhaustive, giving the general surgeon precisely the information he needs. We are convinced that many operators condemn the use of the cystoscope because of their want of knowledge as to its proper use.

As might be readily anticipated, the article on "Stricture of the Urethra," contributed by Dr. J. William White, is clear, strong, and comprehensive. It is gratifying to find such an eminent authority advising a conservative course when treating of stricture, in which he is, indeed, borne out by most operators who have had sufficient experience to warrant an expression of opinion. The performing of meatotomy in every genito-urinary case is very properly condemned. That this operation is indicated in suitable cases, and is at times of great benefit to the patient, there can be no question, but its field of usefulness is limited.

One of the best articles in the book is on "Stone in the Bladder," by Dr. Cabot. It is concise and progressive. That portion which gives the indications which should lead the surgeon to choose the proper operation to suit the condition with which he has to deal is both an attractive and instructive feature.

The operative treatment of varicocele, by Dr. Keyes, is disappointing. He describes at length the method of subcutaneous ligation devised by himself, and at the same time makes the very remarkable statement in reference to the open operation: "I consider it obsolete, and shall not describe it." Herein he differs from many of the leading and progressive surgeons of the day, who are publicly advocating the open method and employing it in their private practice. We can hardly understand how he gets the impression that the operation is obsolete; but even if he had not seen fit to recommend it, it seems to us that a method in such frequent use should be fully described in a work of the kind.

The reason urged against its employment is: "I have seen atrophy of the testicle follow the open operation for varicocele in the hands of one of the most competent surgeons in New York." This seems to us illogical, for if the operation is properly performed, no matter what method is employed, the veins are occluded, and atrophy would be just as liable to follow any method that may be resorted to. We are inclined to think that atrophy would be more liable to follow the mode advised by Dr. Keyes, as he advocates the ligation of the veins in three places, whilst they are tied but twice in the open method. The advocates of the open operation claim that in addition to there being less liability to infection and less pain, the operator can see precisely what he is doing, a great advantage over subcutaneous surgery in these antiseptic days. Orchitis does not follow the open method, and the patient is well within a week. We have performed the operation over fifty times; in every case the patient was convalescent by the sixth day, nor was there any pain, fever, or swelling of the testicle.

We observe that there is no reference made to the device of shortening a pendulous scrotum, when associated with varicocele, by tying the stumps of the veins together after resection.

It is singular that Dr. Wyeth, in his article on "Hydrocele," should advise the almost obsolete method of tapping and injecting the sac in the acute stage of the disease. The usual objection urged against the employment of injections is the great swelling and pain that follow the operation, frequently making it necessary for the patient to be confined to his bed for some ten days, in some cases abscesses forming with their attendant dangers. Then, too, the trouble is apt to recur, when the operation has again to be performed.

No mention is made of the modern treatment by opening the sac, carefully drying and wiping it out, applying carbolic acid, then packing the part with iodoform gauze, and allowing it to remain for twenty-four hours, when it is to be removed and the sides allowed to come together, with a view to obliteration. By following this method the patient suffers no pain, has no fever, is well in from five to six days, and has no recurrence of his affliction. It is applicable to children as well as adults, to double as readily as to single hydrocele.

The work contains a great deal of valuable information, well condensed, and gives the experience of some of the best specialists on genito-urinary diseases. O. H.

PATHOLOGICAL ANATOMY AND HISTOLOGY. By FRANCIS DELAFIELD, M.D., L.L.D., and F. MITCHELL PRUDDEN, M. D. Fourth edition. Illustrated by 300 plates. Pp. 699. New York: William Wood & Co., 1892.

IN the preface to this work the authors state that it "is intended that the student and practitioner shall find in it the information which they need to enable them to perform autopsies, to preserve tissue, to prepare them properly, and to examine them with the microscope." After carefully reviewing the work we must say that in this the work is a success. It is no easy task to prepare a work of this kind, and describe in full the pathological conditions peculiar to each organ or part, especially when we remember the many peculiar pathological conditions the various diseases produce; and also in this era of progressive medicine, when not each year but each month is marked by the description of some *new* and rare disease, with various theories as to its etiology and pathology. We say *new disease* when possibly it would be better to say *new name*. Yet with all this we find the book replete with all that is new, and yet containing only such statements as have been substantiated by careful research.

In reviewing a book of this size, it would be impossible to comment on each chapter separately—hence only such matter deserving especial mention will be referred to. The chapter on Post-mortem Examinations and recognition of lesions of individual organs is a valuable addition, giving an admirable method of procedure. As we have no method prescribed by law in this country for making such examination, as some foreign countries have, it is well to have some definite method formulated by a standard author.

A valuable addition to this chapter is the description of autopsies in

cases of suspected poisoning, and examination of the bodies of new-born children. This is of special importance in these days, when any physician is liable to be called upon to give *expert* testimony.

The idea of incorporating a chapter on methods of preserving and preparing specimens for study is a good one. The methods given are not so complete as those found in special works on the subject, yet sufficiently so to enable one with a slight knowledge of laboratory technique to make a thorough examination. The plates showing degenerative changes in tissue are especially good and evidently original; in fact, this can be said of all the plates the book contains, and is highly commendable, as it is a deplorable fact that many of the illustrations in standard works are copied from other works. The chapter on Inflammation is good, but in a work of this size we think more space should have been given to the discussion of a process upon which so many pathological lesions depend. The chapter on Animal and Vegetable Parasites, with plates of many forms, also of the infectious diseases, showing micro-organisms of each, we think deserve special mention. While vegetable micro-organisms properly belong to works on bacteriology, yet we think the insertion of those concerned in the production of diseases justifiable.

The classification of vegetable parasites agrees with those given by standard works on bacteriology. While the plates illustrating the micro-organisms of infectious diseases are fine, we cannot understand why so many of the diseases were dismissed with so short an article. Remarkable for its shortness is the chapter on Pyæmia and Septicæmia, although explained more fully in another chapter on Embolism.

The article on tumors, we are glad to note, is a most complete one, giving various hypothesis as to origin—embryonic cells and parasitic—with sections showing the various forms of epithelial or connective tissue growths, both typical and atypical. The classification, though a good one from a histological, pathological, and clinical standpoint, is somewhat confusing to the student.

The consideration of the respiratory system is admirable, especially of the various forms of pneumonia, with plates showing different conditions and stages.

One of the most interesting chapters in the book is the one on lesions found in general diseases, in poisoning, and in violent death. The fact of the many controversies as to the conditions found only proves how variable the conditions under such circumstances are.

When commenting on the opinions embodied in a work of this kind, we must remember they not only represent those of the authors, but also those generally accepted by the profession, while the review represents one man's opinion. While there are a few points which we think could have been made clearer, yet the book as a whole is of such excellence as to long hold its place as a standard work on pathological anatomy.

Generally in reviewing a book an essential feature, *i. e.*, the index, is omitted. This usually being the last of the book to be prepared, is done hurriedly, and many a good book is condemned by its index. Such has not been the case in this work. The index, while not elaborate, is complete.

One cannot read this work without commenting on the clearness of the type, quality of the paper, and its excellent appearance. It is a credit to the publishers. D. B.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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Gastro-intestinal Antisepsis.

Dr. Henri Huchard quotes Mathieu, that gastric antisepsis is normally obtained by hydrochloric acid, and Cohn has shown that when the gastric fluid contains seventy-hundredths per mille of hydrochloric acid, lactic acid fermentation is arrested, and from fifty- to seventy-hundredths will check acetic acid fermentation. Lavage should be performed either with pure, preferably boiled water, or with salicylic acid, two to three parts; thymol, ½ part; borate of soda, twenty parts; creolin, ½ to one part per thousand. Or hydrochloric acid, or a saturated aqueous solution of boric acid, may be prescribed. Intestinal antisepsis may be obtained by calomel, in fractional doses every hour, particularly in cholera and typhoid fever. Lavage of the large intestine may be carried out by long tubes, or by special apparatus. Various solutions are used—naphthol, tincture of iodine, sulphide of carbon, chlorate of soda, nitrate of silver, tannic acid, boric acid, the latter, according to Bouchard, giving rise to irritation of the large intestine, with elimination of false membranes. The drugs used are charcoal, iodoform, camphor, calomel, salicylate of bismuth, betol, salol, benzonaphthol, and the naphthols. Naphthol irritates the stomach and increases the hydrochloric acid. In renal disease one must use with care the remedies which in decomposition give rise to salicylic acid, as salicylate of bismuth, betol, and salol. The preference is given to benzo-naphthol, which is harmless, the required amount being from seventy-five to one hundred and fifty grains per day, administered in wafers, with about one-fourth of this amount of charcoal. This remedy passes through the stomach without change, and in the intestine is decomposed into naphthol and benzoic acid, the latter being eliminated by the kidneys as hippuric acid. Resorcin has been used in infantile diarrhœa, and in dilatation and cancer of the stomach, and lactic

acid has been recommended in the green diarrhœa of children, although it succeeds equally well in the various diarrhœas of adults. Képhir has a favorable action also by reason of the lactic acid which it contains. The diet is important. Milk, preferably sterilized, often gives brilliant results.—*Revue générale de Clinique et de Thérapeutique*, 1893, No. 22, p. 338.

The Treatment of Lead Colic by Large Doses of Olive Oil.

Dr. Combemale believes that there is a twofold indication in this condition—to clear the intestines and at the same time to relieve the pain. Weil has reported five cases, in which the oil was taken at a dose of a glass, six or seven ounces, each day, the cure following in from three to five days of treatment, and coinciding with the copious stools induced by the oil. But before this event, from the first glass of oil the pains markedly diminished, showing that in lead colic, besides its purgative action, olive oil has an analgesic effect upon the alimentary canal. In these cases not only was the colic cured, but as well the other manifestations of plumbism, as the myalgias, arthralgias, cutaneous anæsthesias, headaches, and vertigos. The four cases reported by the author confirm the opinions given above as to the value of this remedy. If the oil is vomited, three grains of menthol administered in solution, fifteen minutes preceding the next dose, may cause it to be retained. As to the analgesic effect upon the alimentary canal of the oil or the products resulting from its decomposition, neither oil, nor glycerin, nor fatty acids appear to possess this property. The relief of pain appears to be secondary to the real action of the oil. The relief from pain may be either due to simply obviating intestinal obstruction or to removing from the economy the lead in the various forms with which it is impregnated. The first is an undoubted fact, although he is not far from believing that the oil aids in removing from the economy the stored-up lead. It may, with the albuminate of lead, form a compound, insoluble yet saponifiable, which can be with difficulty absorbed from the intestine.—*Bulletin général de Thérapeutique*, 1893, 20e livr., p. 433.

The Internal Use of Glycerin.

Dr. Blanc states that when in contact with the mucous membrane of the digestive tract it has a stimulant, sometimes even irritant effect, due to the presence of oxidation products, as formic acid. In the rectum it excites vigorous contractions which will readily relieve constipation, but it is rarely given alone, generally as one or two dessertspoonfuls in an enema. In large doses it is poisonous; the lesions resulting are those of acute alcoholism, and even the clinical symptoms may resemble those of intoxication. In moderate doses, three or four drachms per day, it aids the digestive functions, increases the appetite, and if taken fasting, relieves constipation. It assists in producing fat. After a time it may give rise to diarrhœa. It is oxidized in the circulation and transformed into its products of decomposition—formic, oxalic, and carbonic acids. It is eliminated as glycerin, when administered in large doses, by the urine within about one hour after taking, and it disappears four or five hours after. As a substitute for fish oils in alimentation it is an incomplete one, according to Fonssagrives. In prescriptions it can replace

syrups. In hepatic colic it is a specific (Ferrand); all remedies which produce intestinal contractions are cholagogues, and it may be able to dissolve concretions of cholesterin and excite contractions in the biliary passages. Of its use in renal lithiasis, Hermann has reported fourteen cases treated by doses of an ounce and a half, repeated several times. In ten cases the success was brilliant, in four there was complete failure. The action appears to be a purely mechanical one.—*Revue de Thérapeutique Médico-Chirurgicale*, 1893, No. 11, p. 294.

Subcutaneous and Intra-venous Injections of Salt Water.

Dr. Ritter von Hacker illustrates the technique with special reference to cholera. Subcutaneous infusion is carried out with a Pravaz's injection, the hands being disinfected by freely washing with soap and warm water, afterward being held a minute in a two per thousand sublimate solution, or a three per cent. carbolic. The usual site chosen is the abdomen, which should be well rubbed with ether by Bonn's wadding, then followed by the above-mentioned solutions. The apparatus should be sterilized by boiling for one-half hour before use and afterward by dipping in a one per thousand sublimate, eighty per cent. alcohol, or a solution of carbolic, for a minute. The trocar used is similar to the instrument of Billroth's for performing thoracotomie. Three forms of reservoir are shown. Cantani's formula is advised and careful sterilization is insisted upon; the quantity is from one to two quarts in from five to ten minutes. Intra-venous infusion requires similar apparatus, with the exception of the needle, which is preferably of glass. Hayem's formula is recommended, two to two and one-half quarts, within a quarter of an hour. This may be considered a surgical operation and requiring more care than the subcutaneous, but it is one that the practitioner should be prepared to meet in a cholera epidemic.—*The Medical Press and Circular*, 1893, No. 2822, p. 581.

The Management of Typhoid Fever.

Dr. James Barr has treated one hundred and three successive cases, with three deaths. In severe cases he uses the tank treatment, which is not described, but seems to be the placing of a patient upon an Ilkley couch in the tank, wrapping the lower extremities in a blanket and applying a hot tin to the feet while the head and body are constantly flushed with a stream of cold water at a temperature of 54° F. He condemns the use of chlorodyne, but has used salol for five years. His favorite antiseptics are salol and salicylate of bismuth, not used with the view of killing the typhoid bacilli, but to lessen intestinal fermentation and irritation; the former is also a good cholagogue. If there is much nervous depression or deficient vascular tone, these agents are combined with caffeine. For offensive exhalations from patients, he uses a spray of peroxide of hydrogen. An abundant supply of milk and farinaceous food, either plain or peptonized, is allowed. To each pint of milk, whey, or other liquid, there is usually added some such combination of salines as the following: bicarbonates of potassium and sodium, of each ten grains; chloride of sodium, ten grains; chloride of calcium, five grains; and occasionally one or two grains of chloride of potassium—which aids digestion

and keeps the blood supplied with its normal saline constituents. If there be constipation, extract of malt will be found useful; if a stimulating effect is desired, beef-tea, mutton or chicken broth, with vegetable juices, but no cellulose; clear soup, beef-essence, kalatina, and coffee may be given, and one or two raw eggs daily during any stage of the disease. Thirst may be quenched at any time with pure cold water, barley-water, toast-water, whey, or weak lemonade. Almost no alcohol is used. During convalescence a good bitter beer is prescribed and also with advantage malt extract in any stage of the disease.—*The Lancet*, 1893, No. 3637, p. 1119.

The Therapeutics of Digitoxine.

Dr. M. Masius has made a clinical study of this, the most active principle of digitalis, which can be obtained of a constant composition. It is from six to ten times more active than digitaline and digitaleine, insoluble in water, and is very irritant. One-fortieth of a grain is dissolved in chloroform, alcohol, and water, and is administered during the day in divided doses, three times daily or every three hours. In cardiac disease, either when compensation is not established, or is insufficiently so, this principle rapidly gives the effects of digitalis; after forty-eight hours the symptoms of asystole diminish, then disappear, the pulse becomes stronger and less frequent, the dyspnœa and cyanosis lessen, the diuresis increases, and the œdema disappears. This dose can be continued for two or three days, often with good results, and without the appearance of any symptom of poisoning or of irritation of the digestive tract. Its action, once obtained, persists for some time. In Basedow's disease the tachycardia is markedly influenced, and after a dose of a twentieth or a thirtieth of a grain the pulse becomes almost normal. In pneumonia and typhoid fever the temperature is lowered and the pulse becomes slower and gains in force. In support of these statements seven cases are cited, illustrated by pulse, respiration, and temperature charts, and in one case by sphygmographic tracings.—*Bulletin de l'Académie Royale de Médecine de Belgique*, 1893, No. 4, p. 359.

The Treatment of Pulmonary Consumption.

Drs. C. O. Reuteln and H. Arronet give their results for the past five years at Poguljanka, from the use of kumyss and creasote. The kumyss was used as a table beverage, from six to fifteen half-bottles daily, about two-thirds of the quantity being taken during the morning. The contra-indications are hæmoptysis and arterial sclerosis. In cardiac incompetence, renal disease, and some forms of gastric catarrh, it was ordered with care, and the quantity lessened, and particularly without the foam, so as to avoid the carbonic acid gas. The creasote was given in pill form with liquorice, in increasing doses from twenty-five to seventy-five grains per day. If not well borne by the stomach it was administered by enema in olive oil. The conclusions are as follows—nearly three hundred patients being under observation: in incipient phthisis, one-half were cured, one-third relieved, only one-fifth remained stationary, and no case was made worse. In chronic cases one-half were improved, nearly as many remained stationary, and about 5 per cent became worse—none being cured. Of the first class, those patients treated by kumyss

alone showed a greater percentage of cases than when creasote was also administered. In the chronic cases not one showed worse physical signs, and while the percentage of improved and stationary physical signs was about the same, a larger percentage of those treated by kumyss and creasote gained in body weight. — *St. Petersburger medicinische Wochenschrift*, 1893, No. 18, S. 161.

Strontium Bromide in the Treatment of Chronic Epilepsy.

Dr. Henry T. Berkley has used this salt in thirty-grain doses, repeated thrice daily, and finds that it is free from impurities, is non-toxic, does not cause an acne, and has a very much lessened somnolent effect; the patients, without exception, are brighter and more cheerful, and, finally, that certain excitable cases are less quarrelsome after a seizure than under the every-day treatment. The character of the seizures is not altered when they do occur, though some of the attendants were of the opinion that the convulsions were lighter. Thirty-six cases were under observation, and show clearly that this salt has claims to considerably greater merit in lessening the number of seizures than its companion, the bromide of sodium.—*Johns Hopkins Hospital Bulletin*, 1893, No. 31, p. 50.

A New Therapeutic Method.

Dr. C. E. Brown-Séquard presents a very interesting account of this method, which consists in the use of organic liquids extracted from glands and other organs. In 1869 he attempted to establish the fact that all glands, with or without excretory ducts, give to the blood, by an internal secretion, principles which are of great importance, if not necessary. This is the case particularly for the kidneys, the supra-renal capsules, and the sexual glands. In 1889 he found the means for introducing these principles, which consists of injecting under the skin the liquid extract obtained by pressure with the aid of a little water. The innocuity of injections of organic liquid extracts under the skin and in the veins has been established. These organic extracts can be swallowed in some instances—thymus, medulla of bone, thyroid—and their effects obtained. This is not true of the pancreas nor of the sexual glands; the extracts of the latter, however, may be introduced by the rectum with good effect. Organic liquids may be injected through the laryngeal glottis (de La Jarrige). The medical profession owe much to d'Arsonval for the various apparatuses, especially for the filter, which he has contrived for the preparation of these extracts, which are by these means completely sterilized, and are without alteration as regards the albuminoids and soluble ferments. He believes that good effects can be obtained in organic renal affections by injections of the renal liquid, and that in diabetes the use of the liquid extract of pancreas is important. In extensive organic disease of the liver, whether it causes jaundice or not, the hepatic liquid extract should be made use of. This opinion is based upon the fact that the liver also possesses an internal secretion. In the large number of reports of the use of injections of organic liquid from the sexual organs—over sixteen hundred cases under the observation of twelve hundred practitioners—the results have been astonishing. Locomotor ataxia, other kinds of sclerosis of the cord, superficial cancer,

pulmonary tuberculosis, have all been apparently benefited. The use of the thyroid extract has given well-known good results. The use of the organic liquid extract of medulla of bone has been successfully employed in anæmia, debility, and tuberculosis; the cerebral or medullary liquid is of benefit in neurasthenia, locomotor ataxia, and epilepsy; the muscular liquid seems to have great power to give strength to weak muscles. Cardine is a chemical product and not a natural substance, and is not considered here. Héricourt has used serum of dog's blood as a tonic, which is certainly superior to artificial serum, or phosphate or sulphate of soda or other salts. The mode of action appears to be the giving to the blood the principle or principles missing in it.—*British Medical Journal*, 1893, Nos. 1692, p. 1147; 1693, p. 1212.

The Treatment of Sunstroke by Chloroform Narcosis.

Dr. Koerfer reports a single successful case where cramps of the back muscles and of those of the calves were so pronounced that opisthotonus resulted, and when unilateral, episthotonus was seen. In addition to the anæsthesia, cold applications were made to the head, chest, and abdomen. The anæsthesia lasted more than an hour, and was followed by the hypodermatic injection of morphine.—*Deutsche medicinische Wochenschrift*, 1893, No. 28, S. 670.

The Scientific Treatment of Diabetes Mellitus.

Dr. George Harley divides diabetes into five classes: 1, hepatic; 2, cerebral; 3, pancreatic; 4, hereditary; 5, food. He begins by putting the organ supposed to be at fault to rights, be it liver, nervous system, or pancreas, and as the liver is the sugar manufactory of the animal body, always take care that the biliary functions are in good working order. Improve the general health by fresh air and healthy muscular exercise short of fatigue. With diabetes the result of excessive sugar formation, as all hepatic cases are, a restricted diet is essential, but the complete stoppage of the saccharine supply is not wanted, for a certain amount of sugar is absolutely essential to the proper performance of the functions of animal life. A healthy man of average weight uses up daily not less than two pounds of sugar, and a non-starchy diet is not intended to prevent the formation of this requisite amount. Fresh milk is preferable to skimmed, and it may be given freely. In cases of diminished sugar consumption—mal-assimilation—not only fresh milk, but cream, butter, and even cod-liver oil should be given freely, and when greasy stools are met with, as in the pancreatic variety of the disease, with the oil should be administered either liquor potassæ or carbonate of soda dissolved in glycerin in order to emulsify the fats. If the loss of flesh and strength be great, do not hesitate to give freely of the most readily assimilable saccharine substances, as honey, pure cane sugar, or lævulose (Kulz). The beneficial action of the saline purgative waters is best seen in diabetes from excessive sugar formation. Alkaline, non-purgative waters are of more value in the diabetes from diminished consumption of pancreatic cases. Only in exceptional cases is the use of alcohol advised—only when weakness and loss of appetite show themselves in cases of diabetes from excessive formation of sugar. For thirst, bland liquids can be used; phosphoric acid seems to

quench the craving for fluids better than anything else. In excessive sugar formation narcotic drugs act beneficially. In diabetes the result of nerve depression, as well as in those arising from pancreatic disease, strychnine is of great service when given as extract of nux vomica in quarter-grain doses with croton chloral. Everything tending to improve the general health, as quinine, phosphoric and nitro-hydrochloric acids, are of service.—*British Medical Journal*, 1893, No. 1691, p. 1097.

Indications for the Administration of Chloralamid.

Dr. T. Hobart Egbert has used this remedy in more than one hundred cases, and the hypnotic and soporific effects were uniformly gratifying. In preparing patients for operation, of even more importance than the orthodox laxation, is the securing of refreshing sleep and tranquillity of mind. Opiates are excluded from their subsequent depression and digestive disturbances, and many modern hypnotics are likewise inadvisable on account of their marked after-effects. If insomnia is not dependent upon actual physical pain, this remedy is indicated, because it has a tonic action on central nervous cells and fibres, and it relieves intra-cranial congestion. Restlessness, insomnia, and coma vigil, as seen in typhoid fever are indications for this drug, which is best administered in brandy and water, on account of its thus relieving the debility incident to the disease. In the insomnia or fatiguing sleep of nervous prostration, in nocturnal restlessness of excessive mental exertion or emotion, good results are likely to be obtained. The prolonged use of this remedy is not likely to occasion either functional or organic disturbances, nor to lessen its power to relieve. In chorea it should be administered systematically, and best in combination with hyoscyamus and valerian. In the disturbed sleep with unpleasant dreams resulting from alcohol, tobacco, and sexual excesses, it has a special field of usefulness. In mania and melancholia it is superior to chloral and the bromides. It is best administered in extemporaneous elixir, using the elixir simplex of the United States Pharmacopœia.—*Notes on New Remedies*, 1893, No. 1, p. 1.

The Diet for Severe Glycosuria.

Dr. Richard Schmitz believes that in severe forms of this condition a strict animal diet is injurious so far as the symptom is concerned, and, as well, fatal to the patient. In three cases reported he used cacao, with milk and saccharine, whole-bread, or a limited quantity of white bread, animal soups, fish, with a limited amount of potato, the usual green vegetables, eggs, and meat. Good Moselle or Bordeaux wine was also allowed. The results were favorable in the reduction of sugar, increase of strength and appetite, and improvement in the general condition.—*Deutsche medicinische Wochenschrift*, 1893, No. 27, S. 648.

The Treatment of Syphilis by Blood Serum.

Prof. Pierleone Tommasoli uses the serum from lamb and calf's blood, injected with Tursini's syringe, the quantity varying from thirty to one hundred and twenty minims, into the muscles of the nates, the site being cleansed

before and after injection by a 2 per cent. sublimate solution. Thirteen cases are reported. In all cases the manifestations of the disease rapidly disappeared, as is seen under no other method. The average number of injections was six, the largest number thirteen. The constant accompanying symptoms of the injections were fever, pain, induration and swelling at the point of injection, in spite of the sterilization of the fluid. They generally are absent in the first, but appear with later injections and with larger dose are seen inappetence, malaise, and headache. As accidental symptoms are erythema, pallor, weakness, and subnormal temperature. All these symptoms, however, are likely to be transient and of little importance.—*Internationale klinische Rundschau*, 1893, No. 24, S. 889.

The Premature Administration of Mercury in Syphilis.

Mr. J. Ernest Lane protests against the administration of this drug as soon as a chancre shows a tendency to indurate. In such a sore the induration may be inflammatory in its nature, due to the application of irritating substances, and treatment by local means would be followed by healing. He believes it to be more satisfactory to await the appearance of some of the secondary sequelæ, which will render the diagnosis incontestable, and the chances for an eventual cure are improved. When mercury is administered early the secondary manifestations are delayed, but when they do appear they are of a more chronic form and by no means amenable to treatment. These patients are prone to obstinate affections of the mucous membranes and of the iris, and they are liable at a later date to develop symptoms of cerebral syphilis. It is not conclusively proven that the risk of the supervention of tertiary symptoms is in proportion to the severity and prolonged duration of the secondary stage, nor should any attempt be made to abort or shorten this stage. Mercury should be withheld until the appearance of a roseola or some other secondary lesion, and then be promptly and efficiently administered, preferably by inunction.—*Lancet*, 1893, No. 3636, p. 1059.

Poisoning by Diachylon Plaster.

Mr. Frank B. Pape reports two fatal cases where lead plaster had been self-administered for the purpose of procuring abortion. The symptoms were those of lead-poisoning. The necropsy showed a healthy brain; other organs were normal excepting that the intestines were contracted, and in one case contained a considerable quantity of yellowish, sticky fluid. The ointment, according to the evidence given at the inquest held upon the second case, had been made into pills and swallowed in that form.—*British Medical Journal*, 1893, No. 1646, p. 9.

Tolerance of Nitro-glycerin.

Dr. George Evans Reading reports a case of unusual acquired tolerance to nitro-glycerin. The patient was a woman, fifty-seven years of age, who suffered from vertigo and dyspepsia. The urinary examination showed that she was suffering from chronic interstitial nephritis. One one-hundredth of a grain of nitro-glycerin was ordered before meals, and one-twentieth of a

grain of chloride of gold and sodium after meals. The nitro-glycerin produced its well-known physiological effect. Within three months the patient was taking a grain of the drug in solution. As it was determined to continue the physiological effect, a 4 per cent. solution was made, and later a 10 per cent. solution. In less than a year from the beginning the patient was taking a teaspoonful of this solution, equal to six grains of the drug at each dose, and this amount has been continued. Owing to the acrid character of such a concentrated solution it is necessary to dilute it with from four to six ounces of water before taking, and for this reason the dose has not been increased. The renal symptoms, the dyspepsia, and the vertigo have markedly improved.—*The Therapeutic Gazette*, 1893, No. 5, p. 292.

The Elimination of Arsenic.

Dr. Edward S. Wood cites the statement of the books that after medicinal or toxic doses of arsenic the drug is completely eliminated in about three or four weeks. Making use of a more delicate method of analysis of the urine (that of Prof. Charles R. Sawyer) it was shown that in one case that fifty-eight days were required for the complete elimination of twenty-seven minims of Fowler's solution taken during three days. In another case eighty-two days were required to eliminate sixty-nine minims of the same solution. In a third case, when a large toxic dose of white arsenic had been taken in tea, ninety-three days were required for its complete elimination. —*Boston Medical and Surgical Journal*, 1893, vol. cxxviii. p. 414.

The following papers are worthy of notice:

"The Temperature and Treatment in the Various Stages of Cholera," by Dr. Vogl, in the *Münchener medicinische Wochenschrift*, 1893, Nos. 24, S. 452; 26, S. 50. Frequent taking of axillary and rectal temperature enables the physician to determine stages and complications, and thus the better to direct treatment.

"What Can We Expect from the Oxygen Treatment?" by Dr. E. Aron, in the *Deutsche medicinische Wochenschrift*, 1893, No. 27, S. 645. A review of the literature and theoretical discussion, not entirely favorable to the use of this agent.

"The Treatment of Myxœdema and Cretinism," by Mr. G. R. Murray, in the *Lancet*, 1893, No. 3637, p. 1130. A single case treated by thyroid extract.

"A Case of Myxœdema Occurring in an Insane Patient," by Mr. J. W. Alexander, in the *Medical Chronicle*, 1893, No. 3, p. 175. Treated by fresh thyroid gland, with improvement in the disease and in the insanity, the latter, however, but temporary.

"The Question of Immunity and Blood-serum Therapy against Cholera Infection," by Prof. A. Pawlowsky and Herr L. Buchstab, in the *Deutsche medicinische Wochenschrift*, 1893, No. 22, S. 516. Proves that protective material can be preserved, and that it is also harmless.

MEDICINE.

UNDER THE CHARGE OF

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The Senile Form of Multiple Neuritis.

After pointing out the dearth of recorded observations on the subject, and referring to original investigations made in conjunction with Siemerling (Beiträge zur Pathologie der Tabes dorsalis und der peripherischen Nervenlähmung, *Westphal's Archiv*, Bd. xviii., Heft. 1 u. 2), disclosing the existence of degenerative changes in the peripheral nervous apparatus of old persons, Oppenheim (*Berliner klin. Wochenschr.*, No. 25, p. 589) reports the details of two cases of a senile form of multiple neuritis, and refers to four others under his observation. In these six persons (five males and one female), varying from seventy to eighty-two years of age, presenting evidences of arteriosclerosis, and emaciated in greater or less degree, there developed, with slowly progressive intensity, disturbances of motility and sensibility in the upper and lower extremities. The hands and feet were usually affected, and especially the fingers and toes. The affection was invariably insidious in onset. Pain was slight or entirely wanting, but paræsthesiæ, and especially itching, were complained of. There was no elevation of temperature. Objectively, in addition to a condition of general debility, there was found degenerative paresis in the distribution of a number of nerves of the upper and lower extremities. Particularly affected were the small muscles of the hand and in the lower extremities, the peroneal region, and also the tibialis posticus. The palsy was usually but partial. At times it was the more marked in the upper extremities, at other times in the lower; in one case only the lower were involved. The muscles and nerves in the affected regions were sensitive to pressure, but not markedly so. The knee-jerk was wanting in all cases. Sensibility was diminished, principally at the ends of the extremities; there was hyperæsthesia, not complete anæsthesia. The cerebral nerves were not involved. The sphincters also escaped involvement. There was no ataxia. There was slight tremor, which could reasonably be ascribed to the debility of the senile condition. The disease was chronic in course, and manifested a tendency to remission. In two cases almost complete restoration was attained; in a third, decided improvement; in one case aggravation resulted, and in the remainder there was no change. The following are considered to be the characteristics of the senile form of multiple neuritis: (1) The absence of the usual etiological influences—intoxication and infection; (2) the pronounced

chronicity of course; (3) the absence of the mildness of irritative sensory disturbance; (4) the incompleteness of motor and sensory impairment; (5) the freedom from involvement of the cerebral nerves.

Acute Hemorrhagic Nephritis due to Bacilli Coli Communes.

Jeanselme (*Gaz. hebdom. de Méd. et de Chir.*, 1893, No. 24, p. 281) has reported the case of a nervous and anæmic woman, twenty-eight years old, who, without appreciable cause, was seized six days after the menstrual period with violent pain in the lumbar region, to which nausea and vomiting soon were added. The urine became diminished in amount, and was deeply blood-colored. The pain was increased by pressure in the lumbar region, especially upon the left side, and radiated to the hypochondria, while palpation induced nausea. The patient complained of violent headache and derangement of vision. The face was pale, the eyelids a little puffy. There was, however, no œdema of the lower extremities, the respiration was regular, and the intelligence was preserved. The tongue was heavily coated. The temperature was slightly elevated. The pulse was scarcely accelerated. The urine was passed with difficulty, and was of a brownish-black color, resembling black coffee. The patient was placed upon a diet exclusively of milk. The headache, the nausea, and the disturbance of vision soon disappeared. On the third day the dysuria was still pronounced, micturition, however, becoming more frequent. The oliguria persisted until the sixth day. The discoloration of the urine gradually grew less. The quantity of albumin present was never considerable; a trace remained until the thirty-seventh day of the illness. The urine was of acid reaction throughout. It contained hyaline and epithelial tube-casts, red blood-corpuscles and epithelial cells. Two months earlier the woman had had a precisely similar attack. In the diagnosis paroxysmal hemoglobinuria, malignant disease of the kidney, renal calculi, and ascending nephritis were all excluded. There was nothing indicative of enteric fever. The throat had presented no lesion. The stomach had for a long time been dilated. It was finally concluded that the renal lesion was of hematogenous origin, and bacteriological examination of the sediment deposited by the urine disclosed the presence of the bacterium coli communis.

Cholera.

At the recent Congress for Internal Medicine, held at Wiesbaden, Rumpf (*Supplement to Centralbl. f. klin. Medicin*, 1893, No. 25, p. 2) announced the following conclusions at which he had arrived as the result of his experiences during the epidemic of cholera at Hamburg last year: The comma bacillus must be accepted as the etiologic factor of Asiatic cholera. The presence of the bacillus in the intestine does not, however, necessarily lead to the development of cholera or a cholera-like disease. The presence of comma bacilli in apparently healthy persons suggests that the bacilli may temporarily or permanently lose their virulence. As, however, in the course of an epidemic the same etiologic factor in one case leads to an attack of typical cholera, while in another living comma bacilli may pass through the body without disturbance of the general condition, it follows that for the development of

the disease certain accessory conditions are essential; these must be looked for rather in the individual disposition than in the circumstance of time and place. The last two may, however, influence the individual disposition secondarily. The individual disposition consists essentially in derangement of the digestion, which may result from the ingestion of unsuitable food or from the presence in the intestine of other disease-producing factors. In this connection the massed occurrence of cholera nostras and intestinal catarrh contemporarily with Asiatic cholera is noteworthy. Notwithstanding the presence of comma bacilli in the intestine, cultivation by plating methods may yield negative results for several days. The growth of comma bacilli obtained from the dejections is a variable one. A retardation followed in one instance as a result of therapeutic measures, especially in connection with the administration of calomel and enemata of soap water. A similar result was noted in isolated cases after the epidemic in which, with a condition of undisturbed health, comma bacilli were found in the dejecta. The comma bacilli act essentially by the generation of toxins, which act injuriously upon the intestinal epithelium and upon the kidneys, and exercise a paralyzant influence upon the circulation and the production of heat. The comma bacilli may remain in the intestinal tract of man in an active condition until the eighteenth day, and perhaps longer (on an average until the sixth day). This fact, together with the resultant chronic condition, may account for a portion of the secondary phenomena, and particularly for the comatose stage. There is as yet no specific treatment for cholera, although continued investigations in this direction are certainly warranted.

Apyrexial Typhoid Fever.

Dreschfeld (Manchester) records four cases of this nature (*Practitioner*, 1893, No. 298). Excepting pyrexia, the symptoms presented scarcely admitted any doubt of the cases being typhoid. There were persistent diarrhœa and hemorrhage, with enlargement of the spleen and roseolar eruption in two cases, and a third ended fatally by perforation. There was a distinct relapse in two cases. "That they ran their course without any pyrexia may, I think, be equally maintained; for, though the temperature was not taken at the beginning of the attack, in two cases it was carefully observed during the relapse, and in all cases the temperature was taken at a stage of the disease when pyrexia is usually most marked, and often at its highest. Nor can the hemorrhage be looked upon as the cause of the apyrexia, for it was only noticed in two of the four cases. It was not very profuse, and only lasted a few days."

Gerhardt (*Charité Annalen*, 1891, p. 208) records seventeen cases, one of which, with relapse, he observed at Würzburg, and sixteen in Berlin. Of these, eight were females and eight males, between the ages of fourteen and forty-four. The onset of the disease in these cases was mostly very acute, commencing with headache, lassitude, vertigo, anorexia, vomiting, and diarrhœa. Insomnia was a prominent symptom in some of the cases. The diazo-reaction was found present in half the cases, and the urine had all the character of febrile urine. Roseola was present in thirteen cases, and en-

largement of the spleen was absent only in two. The loss of body-weight was but slight.

WENDLAND (*Centralbl. für klin. Med.*, 1892, p. 1103) describes two cases of apyrexial typhoid, with marked cerebral symptoms, both terminating fatally, one in the fifth, the other in the second week of the disease, and in both the autopsy confirmed the diagnosis.

DIET IN CHRONIC BRIGHT'S DISEASE.

AT a recent meeting of the Royal Medical and Chirurgical Society, WHITE (London) presented the results of investigations made on the influence of various diets upon the composition of the urine and general condition of patients suffering from chronic Bright's disease.

The writer first refers to the opinions of many authors, and points out that they are by no means unanimous as to the best diet for patients with chronic Bright's disease. He next shows that all the *a priori* reasons which have been urged in favor of milk or any other particular diet are fallacious, and that consequently the only way to attack the problem is to carefully observe the condition of the urine and the condition of the patient upon different diets. It is very necessary not to draw deductions from too few cases. He has therefore taken ten cases of chronic Bright's disease in which the urine has been carefully analyzed every day for many weeks, so that altogether between four and five hundred analyses of it were made. In each case notes were kept also of the general condition of the patient. The following diets were tried: Milk, 3 pints a day, containing 1076 grains of proteid. Farinaceous, consisting of bread and milk, containing 1137 grains of proteid. Full diet, consisting of bread, butter, milk, meat, rice pudding, and containing 1522 grains of proteid. Sometimes the effect of adding fish, eggs, or more meat was tried. The following results were reached:

1. Quantity of urine. Usually more urine is secreted upon farinaceous or milk diets than upon full diet.

2. Specific gravity. The diet has no certain influence on this, but on the whole it is lower on milk and farinaceous diets than on full diet.

3. The quantity of albumin passed. The figures show that nearly always the albumin passed is more upon milk diet than upon farinaceous, and less upon full diet than upon either milk or farinaceous. Even in the rare instances in which the maximum quantity is passed upon full diet the excess of proteid in the full diet more than compensates for any extra loss of albumin, so that patients always best avoid loss of albumin by a full diet.

4. The quantity of urea passed. The influence of diet upon this is most uncertain; often less urea is passed upon full diet than upon farinaceous, and less upon farinaceous than upon milk. Sometimes the reverse is true.

5. General condition of the patient. The cases distinctly show that full diet is not more liable to lead to uræmia than any other; in fact, in one patient full diet appeared to ward off uræmia, and the patient ultimately recovered. The patients always felt and seemed much better and stronger on full diet, or on farinaceous diet with meat or eggs added, than on milk or farinaceous only. Many patients loath milk diet and greatly dislike farinaceous; on the other hand, they relish full diet.

The author therefore advises full diet, for it does not lead to uræmia, nor is it harmful in any way; but it saves albumin, the patients like it and improve on it in all respects, while they greatly dislike other diets. If the diuretic effect of milk is desired, plenty of water can be drunk.

QUAIN protested against the indiscriminate use of milk in albuminuria, and recommended the use of mercury in some form or other.

MAGUIRE agreed that the amount of albumin passed was not, *per se*, of any great importance, except in as far as it indicated the extent of the general disease. In the treatment of Bright's disease it was more important to consider the patient's general condition than to concentrate one's attention on the condition of the urine. The condition of the circulation ought to be carefully noted. Provided that were done, he thought the choice of diet might be somewhat modified at the different stages of the disease. There was, for instance, an early stage of granular kidney, or rather a stage which would develop into granular kidney if left go its course—a condition to which Dr. Broadbent had called attention years ago, characterized by a high tension pulse, labored heart-beat, and albuminuria. It would be a mistake in such cases to give the patient *carte blanche* in the matter of diet. In the middle period, a period at which the patient seldom came to the hospital, because he might still be unaware that he was the subject of any serious disease, with high arterial tension and a heart capable of dealing with it—in this stage it behooved the physician to be careful in respect of a full diet. In the later varieties, where the patient was suffering from the effects of the continued high tension, a full diet might be of the greatest benefit in order to enable the heart to cope with its difficulties. Then, too, mercury might be given with advantage to counteract the possible ill effects of the full diet.

BROADBENT thought that the general treatment of chronic Bright's disease ought to be guided mainly by the tension of the pulse and the condition of the heart. He had satisfied himself that uræmia was not due to the presence in the blood of urea or of any specific toxines. It was simply a question of the balance of circulation. It was when the resistance at the periphery overmastered the heart, when they got stasis of the cerebral capillaries, that symptoms of uræmia presented themselves. Considerations of that kind explained what had been illustrated by several of the author's cases, that the remedy for threatened uræmia was not starvation or milk diet, but to diminish the resistance at the periphery, and to increase the vigor of the heart's action, with which object in view a more liberal and a more highly nitrogenous diet was of the greatest possible importance. The question of the influence of diet on the excretion of urea was one of the greatest interest. In all these questions further investigation was necessary, special attention being paid to the character of the motions. He confirmed what Sir Richard Quain had said about the benefit derived from occasional doses of calomel. It increased the hepatic and intestinal functions in a way that no other aperient would do, and it had an effect of its own on arterial tension.

BACTERIOLOGY AND IMPROVED STORAGE OF VACCINE LYMPH.

COPEMAN (London) publishes an interesting contribution to this subject in the *British Medical Journal* (1893, No. 1694). The writer refers to papers

by himself and Dr. Crookshank in the transactions of the Bacteriological Section of the International Congress of Hygiene, London, 1891. To no one of the several bacteria (extraneous) grown in nutrient media from vaccine lymph can be assigned the rôle of vaccine virus. "I have shown, however, that there are three species of micro-organisms, one or all of which are almost universally to be found in every specimen of vaccine lymph examined, of which one—the staphylococcus albus—is usually to be found in the upper layers of healthy skin. Of more importance is the fact that in certain cases, though rarely, I have been able to satisfy myself as to the presence of the streptococcus pyogenes; and, moreover, it is on record, in certainly one instance at least, that the streptococcus of erysipelas has also been isolated from a specimen from vaccine lymph. That untoward results should occasionally. and in certain cases, follow the inoculation during the act of vaccination of one or other of the various 'extraneous' organisms which may be present in the lymph employed is not to be wondered at."

This portion of the problem would be solved if it were possible to isolate the contagion of vaccina (or variola), and to carry on without loss of specificity pure cultures of it in some nutrient media from generation to generation.

From former experiments the writer arrived at the conclusion that the opacity of old stored lymph was in all probability due to the multiplication of the extraneous bacteria; and believing that this activity might, among other effects, inhibit the development of the yet undiscovered organism of vaccine, he directs his attention to the discovery of some method of storing lymph which would prevent this.

"Without detailing the various experiments which were carried out with this object in view, a full account of which I have already published, it is necessary in this place to state briefly the lines on which the work was carried out. In the first place, I made trial of the method of fractional heating, which had, in the hands of Kitasato, met with such brilliant success in the isolation of the bacillus of tetanus. Proceeding in this manner, and in every experiment observing the precaution of making control cultures, I presently arrived at a temperature, exposure to which is apparently incompatible with the continued existence of those micro-organisms which can ordinarily be grown when vaccine lymph is inoculated into nutrient jelly. The required temperature ranged between 38° C. and 42° C.; but whereas, after exposure for an hour at the lower register, a few points of growth are occasionally seen in plate cultivation after the lapse of a day or so, while the higher temperature sometimes appeared to exert an injurious effect on the lymph, as far as regards the normal vesiculation which should result from its inoculation in the living animal, I sought for some method of readier application and requiring less delicate manipulation. This I at length found in the admixture with the lymph of a certain proportion of (75 per cent.) glycerin in distilled and sterilized water prior to storage in capillary tubes, which latter also had been sterilized by heat." Müller showed years ago that the addition of such a mixture did not impair the properties of lymph. Dilution in this way has the additional advantage that the mixture does not dry up readily.

"Experiment shows also that in tubes filled with such diluted lymph opacity does not apparently result. As I have previously stated—an observation, by the way, for which I may fairly claim priority—the glycerin

inhibits the growth of, and after a longer or shorter interval kills off altogether, those aërobic bacteria which I have termed 'extraneous.'

"With the assistance of Dr. Corbett, I have also carried out a series of glycerin experiments on a larger scale, not only with the organisms which can be grown from vaccine lymph, but also with numerous other species of bacteria, both pathogenic and saprophytic, in nature. The details of these experiments we shall hope to publish shortly. I will here merely state that the net outcome of our work appears to show that while some pathogenic organisms remain active in admixtures of broth and glycerin, or even in pure glycerin for longer or shorter periods, other pathogenic, and as far as our experiments go, all saprophytic organisms are killed out in from three or four days to as many weeks."

The article concludes with a reference to the paper on a similar subject published by Dr. Achille Sclavo, of Rome, in which this observer independently confirms the writer's views with regard to the mixture of glycerin to vaccine lymph.

SURGERY.

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PYLOROPLASTY FOR NON-MALIGNANT STENOSIS OF THE PYLORUS.

GOULD describes (*The Lancet*, 1893, vol. i., No. 20) the case of a woman aged fifty-eight years, who for more than twenty years had suffered severely from dyspepsia. She had one severe attack of peritonitis, involving the upper abdominal zone. Although very hungry, she was able to eat but very little. All kinds of fluid made her sick. There were frequent attacks of vomiting, when large quantities of undigested food would be rejected. The stomach was much dilated; the bowels were constipated. The patient was wasted to an extreme degree. No tumor was to be felt in the abdomen. Lavage and rectal feeding had not afforded relief. The symptoms were thought to be due to non-malignant stricture of the pylorus, or to pressure from adhesions.

An exploratory laparotomy was performed, and an incision made into the stomach. The pylorus was examined with the little finger and found to be contracted to the size of a goose-quill. The incision was then prolonged through the pylorus and into the duodenum, until it measured two inches or

more. The wound was held widely open by two blunt hooks placed in the middle on either side, and then sewn up transversely with two rows of fine silk sutures. Recovery was rapid and satisfactory, and five months later the patient was "well."

The author prefers this operation to the divulsion of the pylorus as advised by Loreta. He believes pyloroplasty to be safer and to be more likely a permanent success.

Preparatory to the operation the patient's stomach was washed out with a 2½ per cent. solution of salicylic acid. As a consequence, the patient suffered severely from poisoning by this drug. The author warns surgeons against this proceeding.

Pyloroplasty has been performed in twenty-two cases, in addition to the one just reported. Sixteen of these recovered, five died, and in two the result was not stated. This gives a mortality of 25 per cent. The mortality after Loreta's operation is given by Greig Smith as about 40 per cent.

Appendicitis: an Analysis of Sixty-eight Cases.

Barling reports (*British Medical Journal*, 1893, No. 1686) sixty-eight cases diagnosed as typhlitis, perityphlitis, or appendicitis, collected from the records of the General Hospital, Birmingham, for the past seven years.

Seven of the number died, a mortality of 10.3 per cent. The mortality is perhaps lower than actually occurs, as some of the cases were so mild that they might be excluded as being doubtful.

In forty instances a well-marked tumor could be palpated in the right iliac fossa. In some others palpation was unsatisfactory on account of the extreme tenderness and rigidity of the abdominal walls. In the most acute perforative cases tumor is only once mentioned, while of the forty cases having a well-marked tumor in the right iliac region, but four developed abscesses. Only twice were redness and œdema noted; one of these recovered without suppuration. The other case had a well-defined abscess following perforation of the cæcum. In three of the four patients with abscesses, redness and œdema were absent. In but two of these could fluctuation be detected.

Five of the sixty-eight cases relapsed, three of them twice, one three times, and one four times. Four of these finally apparently fully recovered; the fifth was operated on and died. This was, however, before the adoption of the present technique in abdominal operations.

Of the seven fatal cases, one died from a perforation of the cæcum; in the others the appendix was the starting-point of the trouble in every instance. Peritonitis was the cause of death in each case.

The author classifies the cases that require operation under three heads:

1. Those in which pus can be diagnosed with something like certainty.

2. Those in which, from the acuteness of the symptoms, perforation or gangrene of the appendix may be regarded as imminent, if it has not already occurred; and

3. Those in which prolonged rest, blistering, etc., fail to prevent relapse.

It will be understood, of course, that these indications apply to classes of cases rather than to individual cases, each of which must be carefully studied and treated as seems indicated.

The most serious cases are included in the second class. These will need the most careful watching.

Enterectomy and Enterorrhaphy.

In the *Dublin Journal of Medical Science*, 1893, No. 258, Franks reports three cases upon whom he performed resection of the bowel, followed by immediate suture.

The first patient was operated upon for an abdominal tumor, which proved to be a cylindrical epithelioma about the size of the fist, growing from the hepatic half of the transverse colon. Five inches of bowel, including the growth, were resected, and a triangular segment of the mesocolon removed. The edges of the latter were stitched with interrupted catgut sutures, and the divided ends of the colon united by Gély's suture, fine silk being employed, and the peritoneal and muscular coats only transfixed. Each suture was knotted as it was passed. At the time of the report, four and one-half years after the operation, the patient was in perfect health.

The second patient was a man forty-eight years of age, who was suddenly seized with symptoms of intestinal obstruction. An exploratory laparotomy was performed, when it was discovered that a volvulus of the small intestine existed, the bowel already being gangrenous. Sixteen inches were resected, and the operation completed as before. Apparent improvement occurred, but at the end of thirty-six hours evidences of obstruction developed, and death occurred two days after operation. At the autopsy it was found that the intestine below the seat of operation was becoming gangrenous. Firm old blood-clots filled the veins of a large portion of mesentery, and the portal vein was almost occluded by the same condition. This was in no way chargeable to the operation, but was responsible for the death.

Unusual interest, it seems to us, is attached to the third case on account of the opportunity given to examine the wounded intestine five weeks after operation. A woman, aged thirty-six years, was brought to the hospital on account of a strangulated umbilical hernia. It was necessary to resect nine and a quarter inches of the bowel, as its vitality was destroyed; the operation being performed as in the first case. At this time an ovarian cyst as large as a fœtus at term was discovered, but it was considered wise not to add to the gravity of the operation by removing it.

The patient made a satisfactory convalescence after the resection and suture of the intestine, and at the end of five weeks she was thought to be in such a satisfactory condition that the removal of the ovarian tumor could be safely performed. Accordingly this was done, and an opportunity thus afforded of inspecting the bowel. The line of union was so perfect that "it was impossible to detect it with the naked eye," but it could be recognized by touch. "Not even a contraction or depression on the surface marked the line of suture." The utility of this operation is thus fully demonstrated. The patient recovered satisfactorily from the second operation, and six months later was perfectly well.

The author urges suture of the intestine, after resection, in cases of gangrenous hernia, in preference to the formation of an artificial anus, as having a much lower mortality, and being in every way the more ideal operation. The mortality following the establishment of an artificial anus in these cases

is given as 80.7 per cent., while in 222 cases of resection and suture collected by Franks the death-rate was but 48 per cent.

The Selection of the Point of Puncture for Iodoform Injections in Tuberculous Disease of the Hip-joint.

Von Büngner expresses (*Centralblatt für Chirurgie*, 1892, No. 51) his conviction of the anti-tuberculous value of iodoform. The contributions of Wendelstadt, Krause, Bruns, and others, have clearly shown the value of iodoform in tuberculous affections. The application of the remedy is in many locations a simple matter, but with the hip-joint this is not the case. The author has, therefore, been led to make a series of experiments to determine the best method of reaching this joint.

Krause, after experimenting on cadavers, concludes that injections into the hip-joint can best be made with a trocar seven to nine centimetres long. The patient lying flat on the back, the puncture is made close above the trochanter major, midway between its anterior and posterior surface, exactly in the line of the axis of the thigh. The needle should be pushed slowly forward until bone is felt. In no case must the leg be abducted nor rotated externally, as it would thus be easy to come in contact with the acetabulum. Flexion is to be avoided throughout. The best position of the limb is adduction and slight internal rotation. When the point of the trocar comes in contact with bone (the head or neck of the femur) the thigh is adducted as much as possible and the trocar advanced, keeping close above the bone until bony resistance is felt. The instrument will then be in the joint cavity between the head of the femur and the border of the acetabulum. After the stilette has been removed the canula is advanced a little, and the injection may then be made.

In practice, v. Büngner has found this method not always easy of execution, and he was in doubt whether or not the instrument really entered the joint. In some cases the resistance was so great that considerable force was required to introduce the trocar; again the position advised cannot be obtained in many cases, but the great disadvantage was the uncertainty about reaching the joint.

Küster's plan seems much simpler and better to the author, and he has employed it for the past three years. By palpation the point at which the femoral artery crosses the horizontal ramus of the pubis is determined. From this point a line is drawn to the trochanter major. The puncture is made directly into the joint at the inner border of the sartorius muscle, in the line thus determined. This is the shortest and most direct way to reach the hip-joint; at this point the capsule is thinnest, and in thin persons the round head of the femur can be felt in this situation. As the capsule extends from the border of the fibro-cartilage of the joint to the oblique line of the femur, a little deviation of the needle will not result in missing the joint. There are no important structures to wound in this puncture.

The author injected twenty-five cadavers of both sexes and of different ages, one side by Krause's method, and on the other as recommended by Küster, following the rules given above. He used blue gelatin mass and a Pravaz syringe with a canula seven centimetres long, injecting ten grammes in

each case. The joints were opened by v. Langenbeck's incision. In the twenty-five injections made as advised by Krause, the joint had been missed six times. In all these six cases the mass had collected around the upper lateral external surface of the capsule. In nineteen instances the injections had been successful, but the mass had adhered to the upper anterior and posterior surface of the head and neck of the femur, while the lower part and the acetabulum were free. In the injections made by Küster's plan there was not a single case of failure, and the distribution of the mass throughout the joint was uniform. In this method the position of the thigh is a matter of indifference. The reason injections of iodoform have been so successful in disease of the wrist-joint and so unsuccessful in the hip-joint is explained by the fact that in the former the joint has been reached, while in the latter the fluid has not entered the joint in many cases.

v. Büngner employs the 20 per cent. iodoform glycerin mixture, and prefers to inject with a Pravaz syringe having a long thin trocar. He injects five to ten grammes at intervals of from two to four weeks. The joints are not irrigated unless there had been considerable fluid present, and passive movements and massage are not to be employed, as metastasis may thus be caused.

The Sclerogenous Method of Treating White Swelling.

Desguin states (*Ann. et. Bull. de la Soc. Méd. d'Anvers*, September, 1892) that no method of treating recent white swelling is comparable to the sclerogenous method of peripheral injections, a cure being obtained on an average in a period of six weeks. Motion is preserved, in contra-distinction to the old methods which aimed at ankylosis. In joint trouble with suppuration, the treatment restricts the tuberculous process and places the joint in the most favorable condition for surgical interference.

Whatever may be the age of the lesion, the treatment is followed by rapid and considerable diminution in the pain. The joint which has been cured is not more liable to a fresh attack than others.

The Fixation of Wandering Kidney on the Anterior Surface of the Quadratus Lumborum and on the Diaphragm.

Riedel, being dissatisfied with the usual methods of dealing with wandering kidney, describes (*Berliner klinische Wochenschrift*, 1892, No. 28) the method which he has devised:

The usual oblique incision is made, the lateral border of the quadratus lumborum is exposed, then the fat, and finally the posterior part of the capsule of the kidney is split in its whole length, and dissected up so that the kidney is free. It is then placed up under the diaphragm until its lower surface only is seen in the wound. The median border of the capsule is stitched to the quadratus with deep catgut sutures; on the lateral side the peritoneum and subserous fat are everted as far as possible and sewed. The lower part of the kidney is now fixed, but the upper part is free. The kidney is secured in position by gauze tampons, to be particularly packed in the former site of the kidney. The wound is stitched and dressed. The first

dressing is allowed to remain one month when possible, when the wound is pulled apart and the gauze removed.

Of six cases operated on, five remained free from recurrence at the end of a year and a half.

Thiophen-diiodide as a Dressing for Wounds.

Zuckerkandl contributes the following in the *Wiener medizinische Presse*, 1892, No. 49, on this substance. It consists of thiophen, in which two atoms of hydrogen are replaced by two atoms of iodine. It crystallizes in beautiful plates, is insoluble in water, but soluble in ether, alcohol, and chloroform. Impregnated in gauze it has an agreeable aromatic odor. Spiegler claims that it prevents the growth of most micro-organisms. The specific germs of typhus, cholera, and anthrax, and the streptococcus pyogenes are very sensitive to this substance, as are also the staphylococcus aureus and pyocyaneus. In the body, thiophen-diiodide is decomposed with the liberation of iodine, which may be detected in the urine.

It has been used on gauze—10 to 20 per cent.—and also in sticks. Hock prepared gauze by dipping it in a solution of thiophen-diiodide in alcohol and ether, with a little glycerin. It has been employed in all forms of infected wounds, and in those difficult to keep sterile on account of their location. Healthy granulations formed more readily than with iodoform. There was never any evidence of intoxication, nor of local irritation; it even acted well in cases where eczema had been produced by iodoform.

The agreeable odor, non-poisonous and non-irritating properties recommend the drug for further trials.

The Treatment of Empyema by Bülau's Aspiration Drainage.

Aust reports (*Münchener medicinische Wochenschrift*, 1892, No. 45) thirty-three cases of empyema treated by aspiration-drainage at the Altona City Hospital. The necessity for operating in cases with purulent collections in the thorax is not questioned at this time, but the best manner of operating is still under discussion. Bülau first advocated aspiration drainage, and later Jaffé also advised this method.

Of the thirty-three cases reported by the author, eleven were clear cases, without other disease and without complication. All recovered save one; this case was a woman, seventy-five years of age, with general senile degeneration. The average duration of this treatment was 27.4 days; the shortest period was 3 days, and the longest 80 days. The average time of treatment of all cured cases (except those of tuberculous origin) was 37 days. These results equal the best records of more radical measures.

Immermann reports 86 per cent. of complete cures by this method; 9 per cent. needed a second operation to close the fistula, and 5 per cent. died. Bohland had recently published three cases, making in all seventy-one cases of undoubted empyema. Four, or 5.07 per cent. died; five, or 6.34 per cent. needed subsequent operation; sixty-two, or 88.59 per cent. were cured.

The result of all cases, without regard to etiology and complications, is much less favorable, the figures being: cured, 52 per cent.; improved, 18 per cent.; died, 30 per cent. The objection to the method is, of course, that

the permanent drainage may give entrance to other microbes, and thus give rise to a mixed infection. This is to be avoided by very careful antiseptic dressings and by employing a tube that completely fills the opening.

Total Extirpation of the Tongue, and its Effect on the Speech.

Af. Schultén (*Deut. Zeitschr. f. Chirurgie*, 1893, Band xxxv., Heft 5 u. 6) opposes the teaching of Louis, Butlin, and most other writers, who hold that the loss of the tongue has little or no effect on the speech. In partial extirpations of the tongue it is true that articulation is but little interfered with, but it is a very different matter when the tongue is completely removed. Jussieu's case, in which there was congenital absence of the tongue, and yet speech was not interfered with, does not contradict the statement just made. In this instance the condition was physiological, and, besides, the tongue was represented by a nodule; the muscles at the base of the tongue having a certain degree of development.

The author reports the case of a woman, thirty-two years of age, whose tongue had been partially removed for sarcoma, and totally extirpated later on account of a recurrence. Although her companion could understand her after the second operation, Schultén could not. The patient was obliged to construct a different language, substituting sounds she could make for those that were lost. Articulation was, of course, impossible.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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Asepsis in Operations on the Eyes.

Nuel, in *Le Mercredi Medical*, 1893, No. 20, discusses the means by which this is to be attained, and points out the narrow limits of the power of chemical disinfectants. By their aid alone neither sterilization nor complete asepsis is possible. The alkaline reaction of the humors of the eye is unfavorable to the efficiency of the stronger chemical antiseptics. The principal function of these agents is to oppose the development of pathogenic bacteria and diminish their power of resistance to the destructive influence of the normal tissues upon them. Even upon the outside of the eye, the most efficient solutions are too irritant to be used freely with safety.

The sterilization of the skin is to be attempted by thoroughly washing with soap, followed by a solution of corrosive sublimate or similar antiseptic, special care being taken to cleanse the margin of the lids.

Within the conjunctival sac he employs a sublimate solution of 1 : 2000, rarely more diluted, although 1 : 3000 and 1 : 5000 are quite active. The thorough cleansing of the eye is to be repeated three or four times a day for two or three days preceding the operation, where this is practicable, and a final cleansing constitutes the first step of the operation.

For the sterilization of instruments the chemical antiseptics are unsuitable on account of their corrosive action. The best method is by boiling in hot water, or in a solution of sodium carbonate, 1½ or 2 per cent. For instruments that do not stand this heat a 1 per cent. solution of cyanide of mercury is recommended.

As an after-dressing he depends on covering the parts with antiseptic gauze; he does not employ the instillation of powdered iodoform or aristol, believing that their advantages do not compensate for the presence in the conjunctival sac of a bulky foreign body.

Toxic Amblyopia from Iodoform.

Priestley Smith (*Ophthalmic Review*, 1893, No. 138) reports the case of a man, aged thirty-one, suffering from chronic tubercular pleurisy and peritonitis. He was placed on the internal use of iodoform, the dose being increased until he took thirty-two grains a day in pill form. He took altogether about one thousand grains in forty-one days, when the drug was stopped on account of toxic symptoms, especially amblyopia. In both eyes there was slight haziness of the margin of the disk. Vision was greatly impaired, with an absolute central scotoma for white and a scotoma for red larger than is commonly found in tobacco amblyopia. The loss of vision began a day or two before the iodoform was stopped. Re-examination, seven days after this, showed the haziness of the disks rather more pronounced, but the vision had already begun to improve. Four weeks later he had small absolute scotoma involving the fixation point. Vision of the right eye 6/xxxvi., left 6/xxiv. Subcutaneous injections of strychnia, and iron and strychnia by the mouth were given, and at the end of three months from the onset of amblyopia, vision was 6/viii. in each eye, and no scotoma could be found.

The amblyopia was associated with headache, giddiness, faintness, constant taste and smell of iodoform, twitching of the hands, emotional depression, change of the urine from high acidity to alkalinity; and, after the iodoform was stopped, slight ptosis and great drowsiness, succeeded by irritability. There were also numbness and tingling in the legs, and the knee-jerks were increased. The patient had been a regular smoker before coming under treatment, but had only smoked once in the seven weeks preceding the onset of the amblyopia, and during the period of recovery he resumed smoking, so that causation by tobacco could be excluded.

Hirschberg reported a case in which iodoform was used as a dressing after a hip-joint operation, and Hutchinson one in which the patient had taken daily for six months nine grains of iodoform and six grains of creasote in pill form.

Hop-pickers' Ophthalmia.

Adams (*British Medical Journal*, 1893, No. 1688) describes a form of ocular inflammation occurring in the latter part of August and throughout the month of September among hop-pickers. It is marked by the signs of acute conjunctivitis, such as commonly arise from severe mechanical irritation. In some cases the nutrition of the cornea is so impaired that necrosis results; acute keratitis and hypopyon are not uncommon complications in the more severe cases. In one case a concurrent affection of the nasal mucous membrane was noted. It occurs chiefly in women and children, who do most of the picking, and is confined to persons actively engaged in the hop industry.

Careful inquiry showed that it was not due to any catarrhal cause or general unfavorable hygienic conditions. In some cases it is distinctly ascribed to the rubbing of the eyes with hands soiled with hops. Those who do not come into such close contact with the hops escape.

Careful investigation seems to show that it is not caused by any irritant used in the cultivation of hops or by the chemical constituents of the plant. The hop plant, however, belongs to the same family as the common stinging nettle, and on microscopic examination its bracts, leaves, and bines are found covered with thorn-like, hairy particles, these being largest and coarsest on the bines. This latter fact seems to explain the prevalence of the disease during the hop harvest.

The probable mode of causation of the inflammation is by the carrying of some of these irritant spines to the eye, where they become impacted in the conjunctiva and cornea; and their irritant effect is probably increased by the volatile and resinous matters of the hop itself or the micro-organisms which they may carry.

The treatment is that of an ordinary traumatic conjunctivitis, with special attention to cleanliness, rest of the lids, and exclusion of light.

Hemianopsia and Ophthalmoplegia, with Partial Recovery.

Würdemann and Barnes (*Archives of Ophthalmology*, 1893, vol. xxi., No. 2) report the case of a man who had suffered from chronic malarial poisoning followed by general anæmia. His sight, previously good, had suddenly been impaired by loss of the temporal halves of both fields of vision, probably due to a circumscribed hemorrhage at the anterior portion of the optic chiasm. There was subsequent improvement, but partial atrophy of the optic nerve remained. After this a central scotoma developed in both eyes, increasing until axial vision was abolished. Central vision then returned, leaving contracted color fields.

Later, after an attack of dysentery, he suffered from right homonymous hemianopsia, accompanied by paralysis of the left internal rectus muscle and left ptosis. This attack was probably due to hemorrhage along the left optic tract and the third nerve of the same side. This was again followed by recovery, except for the absence of the centre of the field of vision for red.

The authors regard attacks of hemianopsia, and the distinct apoplectic seizures that accompanied them, as due to miliary aneurisms engendered by the prolonged general anæmia.

Intra-ocular Tumors.

Lawford (*British Medical Journal*, 1893, No. 1659) points out that these growths have heretofore been regarded either as sarcomata springing from the choroid, or glioma of the retina. He believes that such classification is sometimes erroneous, that a small number of these tumors belong to the epithelial type, and that the number of such is larger than appears from published records.

The difference between sarcoma and carcinoma in typical specimens is known to all, but every one has occasionally found difficulty in deciding upon the nature of atypical growths. There is no reason why tumors of the epithelial type should not originate within the eyeball, and some *a priori* grounds for expecting their occasional development. The intra-ocular carcinomata belong chiefly to the small group of melano-carcinomata, the rarity of which may have increased the tendency to consider all primary choroidal tumors sarcomatous.

The prognosis for sarcoma and glioma has been fairly worked out, but as to the carcinomata originating within the eye it has yet to be determined.

The Interrupted Blood Column seen in the Vessels of the Eye.

Friedenwald (*Ophthalmic Review*, 1893, No. 140) discusses the phenomena which is observed in embolism of the central artery of the retina, in simple glaucoma with great interference with the retinal circulation, in the retinal veins at death, and in veins of the conjunctiva and cornea whose lumen is very much greater than that of the corresponding arteries. The appearance is that of red masses, stationary, or moving slowly along the vessels, with colorless intervals.

By microscopic examination it is found that this appearance is due to the fact that the red blood-corpuscles are collected into masses, and the space between these masses is occupied by blood plasma and white corpuscles. This fact forces the conclusion that there is a cohesive attraction between the red blood-corpuscles which naturally manifests itself only when the blood current is very slow.

Skin-grafting as a Substitute for Transplantation of the Conjunctiva.

Hotz (*Annals of Ophthalmology and Otology*, 1893, vol. ii., No. 2) has used Thiersch's skin-grafts for the relief of extensive adhesions of the lower lid to the eyeball, following destruction of the conjunctiva by lime and hot metal; for excessive shrinkage of the conjunctiva in trachomatous eyes; to enlarge a contracted socket, and make possible the insertion of an artificial eye; and to fill the gap left by the removal of a large pterygium. Although the implanted scales do not gain the structural character of a true mucous membrane, they do become as smooth and soft as the surrounding conjunctiva, and differ from it only by their opaque whitish color.

Their transplantation is comparatively simple, and usually crowned with success; while the transplanting of mucous membrane is very tedious, and the results usually anything but satisfactory.

OBSTETRICS.

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PARASITIC FŒTUS.

PINARD reported (*Congrès Francais de Chirurgie*, 1893) a case of parasitic fœtus included under the skin of the neck of a new-born infant, and forming a large tumor. Its walls permitted the recognition of fœtal extremities. It was removed by a circular incision and amputation after ligation. The operation was a success. The parasite was almost perfect.

THE RELATION OF TUBAL DISEASE TO ECTOPIC PREGNANCY.

LAWSON TAIT (*Medical Press*, 1893, p. 506) relates a curious case extracted from the Philosophical *Transactions* of the Royal Society of London, 1741, where a woman with an unusual history of pregnancy, presumably ectopic, had abdominal section performed on her by a butcher, who extracted through the wound the perfect skeleton of a fœtus and several pieces of putrefied flesh. She made a good recovery save for an umbilical hernia. The author gives it as his opinion that normal impregnation can never take place in the Fallopian tube. In pathological cases in which this happens it has been proved beyond a doubt that it is the result of ciliary desquamation, and per contra, that when the epithelium of the tube is perfect, it is a bar to tubal gestation.

In the above article is a very interesting description of the anatomy of the broad ligament showing the various ways in which rupture may take place.

SYMPHYSIOTOMY.

EKSTEIN (*Centralblatt für Gynäkologie*, 1893, No. 19) reports the following case of symphysiotomy with fatal termination.

A woman, forty years old and pregnant for the first time. The pelvic measurements were as follows: iliac spines, 22 cm.; iliac crests, 28 cm.; trochanters, 31 cm.; conjugata externa, 17 cm.; conjugata diagonalis, 10½ cm.; conjugata vera, 8 to 8½ cm. Patient had been in labor three days when operation was done. Hemorrhage from subcutaneous tissue considerable. The symphysis was separated by means of a herniotome and was incised to

the depth of 1 cm., which did not cut through it entirely. After incision the joint separated ½ cm. Forceps applied in the right oblique diameter. After the third traction was made on the fœtal head the remaining portion of the symphysis separated with an audible sound. The pelvis was artificially protected on both sides, and the child delivered without trouble. Symphysis separated about 4 cm. during the delivery. Symphysis united by silk sutures and fixed by means of an Esmarch rubber bandage. There was complete rupture of the perineum. Immediately after coming from under the chloroform, patient showed unfavorable symptoms and died three days after from acute degeneration of the heart muscle. Paralysis of the rectum was present. Symphysis was in good process of healing. The author does not consider symphysiotomy, with proper assistance, a difficult operation, but believes that the joint should not be completely separated.

The Duration and Strength of Uterine Contraction in Relation to the Inter-Contractile Period.

Westermark (Stockholm) (*Centralblatt für Gynäkologie*, 1893, No. 21) in a number of investigations on the activity of the human uterus in normal birth, demonstrates the following interesting facts:

1. The average duration of the interval between the pains (Wehenpause) was 132.4 seconds (maximum, 105–525 seconds; minimum, 10–150 seconds; mean, 66.7–392.6 seconds); they are greatest in the beginning of the period of dilatation. From this time they decrease until they attain their minimum during the period of expulsion.

2. The intra-uterine pressure during the interval between pains was registered in the plane of the pelvic inlet, and depends: *a*. Upon the intra-abdominal pressure. *b*. Upon the difference in level between the pelvic inlet and the highest point of the uterus. *c*. By the tension of the uterine wall, which tension is settled by the strength of contraction of the uterine muscle and by the volume of its contents.

The intra-abdominal pressure depends upon: *a*. The activity of the abdominal pressure; during the interval this is frequently increased or diminished by coughing, vomiting, etc. *b*. The stretching of the abdomen in consequence of accidental causes, as gas in the intestines, etc. It also varies with the *position* of the body.

As long as the volume of the uterine contents remains the same the intra-uterine pressure is unchanged from one interval to another. When the rupture of the membranes occurs a decrease of this pressure takes place in consequence of a lessening in the uterine contents.

3. The pains reached their maximum on an average in 25 to 30 seconds; the acme of the maximum was reached in 8.1 seconds; from which time they gradually decreased. The higher the intra-uterine pressure the greater the pain. Combined and double pains with pseudo-pauses, were frequently registered, but no persistaltic action of the uterus could be detected.

4. The average of the frequency of the pains was one in 4 23 minutes; they were small at the beginning of the period of dilatation and gradually increased until they reached their maximum at the end of the dilatation and during the period of expulsion.

5. The duration of the pains averaged 69 seconds, and were in relation to the pause as 1 to 2.

Pelvic Changes caused by Coxalgia.

Brunceau (*Centralblatt für Gynäkologie*, 1893, No. 21) in an investigation of a number of pelves in persons affected with coxalgia finds that the pelvis may be narrowed in either the sound or the diseased side; the first presents the characteristic deformity. In one-sided coxalgia the weight of the body is chiefly carried on the sound side, which causes an oblique shifting of the pelvis. The immediate cause of the deformity is the early ceasing of the disease, with inequality of the wings of the sacrum—going about with crutches and stocks. As regards its effect on labor he gives the following statistics: In 45 deliveries in twenty-four women with coxalgic pelves, he had 31 *spontaneous* births, 2 being at seven months; 14 cases *artificial delivery*, of which 3 were basiotripsy, 3 artificial premature delivery, 8 delivery by forceps. One woman died. Of the children, 45 in number, 2 were macerated at delivery; three times was the head pierced. In most of the cases of artificial delivery there was osseous union between the coccyx and sacrum.

The Position of the Bladder and Cervix during Pregnancy.

Fehling (*Centralblatt für Gynäkologie*, 1893, No. 23) in an article on the "Cervix and Bladder in Pregnancy," shows that the capacity of the bladder varies somewhat with the time of pregnancy. In the non-pregnant its position is entirely in the small pelvis, even when full; this also is its position during the first month. With gradual filling the upper border rises perpendicularly to 16 cm. above the upper symphysis border.

As long as any portion of the bladder remains in the pelvis the vaginal portion is strongly moved about, mostly posteriorly and upward or to the left, owing to the firm connection between the base of this organ and the anterior cervical wall. As pregnancy advances and the head of the fœtus enters the pelvic brim, the bladder is pushed still farther upward so that none of it remains in the pelvis; it then becomes an abdominal organ. The filling of the bladder and its upward rising may somewhat change the position of the fœtal head, and cause for a time a lengthening of the cervix.

As a practical result of his investigation, the author demonstrates the importance of emptying the bladder in order to cause the head of the child to come lower in the pelvis.

And it is possible, by filling the bladder with from 300 to 400 c.cm. of water to change the fœtal presentation from a head to an oblique one. He also mentions the rising of the bladder from the pelvis as pregnancy advances as a diagnostic point in determining the period of gestation.

Symphysiotomy.

Leopold von Dittel, Jr. (*Centralblatt für Gynäkol.*, 1893, No. 23), cites a number of cases in which symphysiotomy was performed with fatal or un-

favorable results. In the first case, a woman with a rhachitic flat pelvis, the operation was performed and the child delivered by axis traction, the symphysis separating 7 cm. Episiotomy was also done to aid delivery. In the delivery the clitoris and urethra were both torn; there was considerable hemorrhage. The child died the next day from cerebral hemorrhage and skull fracture. The case terminated fatally for the mother; the cause of death being purulent endometritis of post-partum type, combined with septicæmia and anæmia from the hemorrhage. The urethra, vagina, and cervix were found badly torn after death. Case 2: A secundipara with evidence of rhachitis. Pelvic measurements: Spines, 28 cm.; crests, 29½ cm.; troch., 31 cm.; d. brim, 17 cm.; conj. diag., 11 cm.; conj. vera, 9½ cm. Double promontory. Symphysiotomy was performed, and a deeply asphyxiated child delivered, the pubic articulation separating 6 cm. In this case the urethra was completely torn from the clitoris. The patient remained in bed more than six weeks. Pelvic joint healed badly, and incontinence of urine continued for some time.

In addition to the above he gives the outlines of four other cases, all with various degrees of pelvic contraction, and in all the terminations were unfavorable to mother or child, or both.

He concludes by giving his opinion as adverse to symphysiotomy as an operation for the practical surgeon.

KASCHKAROFF (*Centralblatt für Gynäk.*, 1893, No. 19) contributes the reports of two cases of symphysiotomy, with notes on the same, to the literature of the subject. The first was an unmarried primipara of rhachitic history, with pelvic diameters as follows: Spines, 27 cm.; crests, 28 cm.; troch., 30 cm.; conj. v., 8 cm., with a considerable scoliosis. The symphysis after the operation separated 2 cm. The pelvic joint was only partially incised, and with the aid of forceps the child was easily extracted. Perfect recovery followed; the pubic joint afterwards found to be completely immovable. The child presented in the first vertex position. The result in the second case was not so fortunate. The patient, in her second pregnancy, was suffering from eclampsia when operated on. Ascites, with œdema of arms and legs, was present. The pelvis showed flattening, the conjugata vera being but 9 cm. The child presented in first position. Symphysis after operation showed a widening of 3.5 cm., further expansion being prevented by side pressure. The patient was delivered under chloroform on account of the eclampsia. The child was extracted by forceps, and died soon after birth. The patient died from eclampsia two days after. On section, the wound was found in good condition; parenchymatous inflammation of the kidneys was present. An examination of the sacro-iliac joints and their ligaments showed them to be sound; but on separating them 5 cm. the articulations were broken. The symphysis measured 4 cm. in length; the upper border 2.3 cm., and the lower 1.5 cm. in thickness.

A Case of Conception in the Puerperal Period.

KRONIG (Gesellschaft für Geburtshülfe zu Leipzig; *Centralblatt für Gynäk.*, 1893, No. 19) reports a case of conception in the puerperal period.

A woman, twenty-two years old, was delivered on July 4, 1892, of a

healthy child. Four days after delivery coitus took place, but was followed by sexual abstinence lasting three months. Menstruation did not again appear, and in the following November fœtal movements were felt by the patient. On March 10, 1893, a healthy child was born, the pregnancy lasting but 243 days, 27 days less than the average. After a careful study of this case the writer comes to the following conclusions:

1. That a perfect child can be born at the end of a less than normal pregnancy (243 days).
2. That spermatozoids can live in the lochial secretion.
3. That ovarian activity is not entirely suspended during pregnancy.
4. Menstruation and ovulation are not dependent on each other.
5. In healthy and strong individuals a very rapid regeneration of the uterine mucous membrane takes place after delivery, and the development of an impregnated ovum in it is very soon possible.

Uterine Rotation in Pregnancy and Parturition.

Ferguson (*Edinburgh Med. Journ.*, 1893, p. 1113) remarks that it is to be particularly noted that in examining post partum uteri in ordinary post-mortem examinations, they will be found to have fallen backward owing to the relaxation of the muscles and emptying of the vessels in conjunction with the dorsal decubitus of the body.

There is usually from various causes an inclination of the fundus toward the right side. If the bladder is distended, however, it may be thrown toward the left. According to some authorities the fundus uteri generally falls over to the side to which it has drawn itself back over the child's breech. It is doubtful if after delivery any rotation of the uterus on its central axis takes place, except when caused by a distended bladder, in which case a twist toward the right has been noted.

During pregnancy, however, the uterus is rotated to the right in 80 to 90 per cent. of cases and bears an important connection with the position of the presenting part. Regarding the position of the ovaries in pregnancy the writer says that, post partum, their distance below the fundus uteri is not nearly so great as in the full-term gravid uterus; after labor they bear much the same relation to the uterus, so far as distance below the fundus goes, as in the non-pregnant state.

There can be no doubt that the ovaries increase in size and softness during pregnancy, the one containing the corpus luteum being the larger; they also increase in sensitiveness in the gravid state. Chaignot, in less than three months made thirty consecutive clinical investigations on hospital cases, and found that abdominal palpation employed at the end of pregnancy may produce, on the sides of the uterus in a certain number of women, a sudden and sometimes sharp pain which he considers to be caused by pressure on the ovary. This pain is most frequently found to the left, owing to the torsion of the uterus bringing forward its left lateral edge. The usual position of the ovary, according to Chaignot, is near a line drawn from the anterior superior spine to the umbilicus, usually a few centimetres above it, in the last months of gestation. The average distances are as follows: Left side, 8 to 10 cm. from anterior superior spines; 17 to 19 cm. from umbilicus; 5 to 6 cm. behind

prominence formed by the round ligament. Right side, 7 to 9 cm. from anterior superior spines; 18 to 20 cm. from umbilicus; 5 to 6 cm. from round ligament. The writer appends an abstract of Chaignot's cases as follows: 23 cases ovary on left side; 17 were O.L.A. throughout, 3 were O.L.A. with left ovarian pain to begin with. One changed to O.D.P. and the left ovarian pain changed to right ovarian pain. One changed to O.L.P., and the pain on pressure disappeared, and the ovary likewise ceased to be felt. One changed to O.D.P., and the ovarian pain, though still in the same place, was not so sharp. Three were O.D.P. throughout. Three cases ovary felt on right side three were O.D.P. throughout. Four cases ovary felt on both sides; two were O.L.A., two were O.D.P.

Allantoido-angiopagous Twins.

Ballantyne (*Edinburgh Med. Journ.*, 1893, p. 1095), in the second of his studies in "Fœtal Pathology on Allantoido-angiopagous Twins," after discussing the definition of the above-named class of monsters, concludes:

1. That the fœtus paracephalus dipus cardiacus is always the product of a plural pregnancy; usually there is one other fœtus *in utero*, but sometimes there are two.

2. The co-twin is generally normal in appearance, but it is often born dead or dies soon after birth. It was always of the same sex as the paracephalic fœtus, except in one case. It is nearly always the first to be born.

3. The mother is almost invariably a multipara, is usually somewhat advanced in years, and has often had a bad obstetric history. In no case is there a record of a previous twin confinement.

4. The pregnancy which results in the birth of a paracephalic fœtus nearly always terminates prematurely, and is occasionally complicated by hydramnios. The fœtus is unable to live separate from the mother.

The paracephalic fœtus has external appearances which are markedly monstrous; it is generally small in size, but is larger than its co-twin, and it nearly always shows an œdemetous state of the subcutaneous tissue. The head is usually greatly deformed, the brain hydrocephalic, and the face very imperfect. The upper limbs are nearly always defective; the lower limbs are always present, and are usually normal, except as regards the number of the toes. The thoracic walls are sometimes defective; the heart is always present, but nearly always greatly malformed, and is sometimes not in direct communication with the umbilical vessels; the lungs are often absent and the diaphragm wanting. The liver, spleen, stomach, and pancreas are usually absent; the intestine is defective, and generally ends blindly; the kidneys, ureters, and bladder are in most cases present, but are sometimes defective, and the genital organs are occasionally imperfect or rudimentary. The placenta is probably always single; the amniotic sacs are usually separate; and the vessels of the umbilical cord of the deformed twin are usually defective and communicate with those of the cord of the normal twin. It would seem that the paracephalic fœtus with a heart must have two circulations—one carried on by its own heart and the vessels connected with it, the other by means of the vessels passing to it from the normal twin; both these circulations are no doubt imperfect, and this imperfection is doubtless the cause of the œdema which is so common.

The Relation of Pelvic Peritonitis to Ectopic Pregnancy.

Martin (*Berliner klinische Wochenschrift*, 1893, No. 22), after giving the opinions of various authors on the relation of pelvic peritonitis to ectopic pregnancy, records that, in his own opinion, in the majority of cases the peritonitis acts more as a rapid consequence of the ectopic insertion of the ovum than as a cause of this abnormality. The growing ovum works unmistakably as a centre of inflammation, causing not unimportant changes in the immediate and distant neighborhood, such as adhesions and other changes found after pelvic peritonitis from other causes. Also against the theory of tubal disease offering a cause for ectopic gestation, he argues that the impregnated ovum requires a healthy situation in which to grow, and thinks it very uncertain that it is possible for it to develop on the diseased mucous membrane of the uterus, much less in an unhealthy tube. The mucous membrane may have previously been diseased, but must be healthy at the time of the impregnation and attachment of the ovum.

The author then describes a case on which laparotomy was performed for right tubal pregnancy. The tumor was the size of a pigeon's egg. The omentum and the peritoneum, parietal and visceral, were engorged with blood. The ovum, which was perhaps four weeks advanced in gestation, was situated between the fimbriated extremity and the ovary. The ovary was considerably enlarged and was partially covered by a rough covering. Its surface was considerably congested and had remaining a single follicular elevation.

First Symphysiotomy on the Pacific Coast.

Holmes (*New York Journal of Gynecology and Obstetrics*, 1893, No. 5) reports a case of a primipara with a conjugata vera of three inches, upon whom symphysiotomy was performed. The cartilage between the bones was cut with a scalpel (Galbiati's knife not being at hand) from before backward, from above downward, with little trouble. Child was extracted by means of forceps. During birth of child the pubic bones separated more than one and a half inches. Patient made a good recovery.

Extra-uterine Pregnancy, with Rupture of the Tube.

Burrage (*New York Journal of Gynecology and Obstetrics*, 1893, No. 5) reports a case of a woman ten months married, who, with a history of previous good health, was seized with a most severe and sudden pain in the lower abdomen while making a bed. Patient had had no menstruation during September or October.

On incising the peritoneum, which was thickened and opaque, there was a gush of gas having the foulest sort of odor. Dark fluid blood and disorganized clots and shreds of green, gangrenous tissue welled up out of the wound. It appeared as if he had opened into the sac of a hæmatocele, which contained a quart of fluid and débris. The sac and cavity were washed with hot salt solution. Both ovaries and tubes adherent to the sac-walls were so rotten that it was impossible to form a pedicle. Right tube was three times the normal size. After some symptoms of septic absorption, patient made a good

recovery, although a sinus existed to the bottom of Douglas's cul-de-sac for one month after operation.

Hypertrophic Elongation of the Cervix as a Cause of Obstructed Labor.

Griffith (*British Med. Journ.*, 1893, No. 1688) cites two cases (his only experience in forty years) of obstructed labor caused by an elongated and enlarged cervix and os uteri. In the first, a woman, the mother of two children, the os was in the vulva, was excessively swollen and livid, with a posterior and anterior slit at least an inch deep in the cervix, which was much elongated. After a labor of eight days, during which the patient was in great suffering, the pains ceased altogether, and it was found that the uterus had ruptured transversely and exactly on a level with the peritoneal surface of the roof of the vagina. Porro's operation was recommended, but was refused by the family of the patient. She died fifteen hours afterward.

In the second case, which was very similar to the first, the long forceps was applied, but it was not until three attempts had been made that delivery was finally accomplished. Metritis set in, and in five or six days the patient succumbed.

GYNECOLOGY.

UNDER THE CHARGE OF

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Metrostaxis and Menstruation after Operations on the Broad Ligament.

Sinclair (*British Med. Journal*, May 27, 1893) draws the following inferences from his clinical observations on this subject: Metrostaxis following removal of the ovaries and tubes, where it occurs immediately after operation or later, is due to the fact that the main arteries have not been tied together with the venous plexuses. It thus results that while the blood-supply to the uterus is still free, the return flow is interrupted, the organ remains congested, and involution is retarded, even after the adnexa have been thoroughly removed, menstruation continuing for months, or even years. On the other hand, if the arteries have been ligated, even though the tubes and portions of the ovaries have been left, the uterus undergoes involution, and menstruation eventually ceases. It follows that the Fallopian tubes have no causative influence upon the monthly flow.

The practical deduction from these facts is that in ligating the pedicles the operation should include the main branches of the ovarian arteries, especially in cases of uterine fibroid, in which the main purpose is to induce premature menopause.

[This explanation of the familiar phenomenon observed after removal of

the adnexa is a plausible one, but evidently does not apply to every case of metrostaxis or pseudo-menstruation, since it is well known that the persistent congestion, and resulting endometritis fungosa, which is observed after oöphorectomy, is referable not infrequently to the presence of retroflexion, pelvic indurations and adhesions, broad-ligament cysts, etc. Our practical experience of the free vascular anastomosis in the broad ligaments, gained in abdominal hysterectomy, has proved how little the blood-supply of the corpus uteri is affected by ligating the ovarian vessels alone.—H. C. C.]

Clinical Study of Cervical Dysmenorrhœa.

Hanfield-Jones (*ibid.*) criticises the attempt of authors to refer all cases of uterine dysmenorrhœa to a single cause, and cites a number of cases from his own practice to show how many different factors may be active. Among these are the neuralgic, inflammatory, and spasmodic types. The writer believes that rhythmical uterine contractions occur at the beginning of menstruation, which, with simultaneous inhibition of the sphincter fibres, causes dilatation of the cervical canal. Under normal conditions these phenomena are unaccompanied by pain. Any pathological condition which delays the process of dilatation is attended with painful menstruation, such as displacement of the uterus, muscular spasm at the os internum, fibroid thickening at the same point, and hyperæsthesia of the nerve-endings resulting from endometritis. Practically, when cervical endometritis is present, hot douches, leeching, and applications of carbolic acid or iodized phenol are indicated, but when no such disease can be found dilatation offers the most certain means of relief.

Treatment of Pelvic Suppuration.

Terrier and Hartmann, in a paper read before the recent French Surgical Congress (*Le Mercredi Médical*, 1893, No. 15), report fifty-nine cases of abdominal section, with a mortality of nearly 12 per cent. Drainage was employed in forty-three cases, without irrigation. In two-thirds of the patients the ultimate results were entirely satisfactory. The writers consider that their experience justifies them in preferring cœliotomy to vaginal hysterectomy in the treatment of suppuration of the adnexa, since the risks are less, and it is possible in some cases to preserve one tube and ovary. In the discussion which followed, Michaux defended hysterectomy, quoting the relative results in three hundred and seventy-five hysterectomies and an equal number of cœliotomies—the mortality in the former being 8½, in the latter 15 per cent.

Suppuration in Ovarian Cysts following Typhoid Fever.

Werth (*Deutsche med. Wochenschrift*, 1893, No. 21) reports the case of a patient upon whom he performed ovariotomy several months after recovery from typhoid, removing a cyst with purulent contents, bacteriological examination of which revealed the presence of typhoid bacilli. This case is unique, not only on account of the site of the infection, but the prolonged survival of the specific bacilli of typhoid in a purulent focus. The case seems to favor the theory of possible multiple infection, since these micro-

organisms have been found in the bones, lungs, testicles, and peritoneum, where they have caused suppuration. In every case of suppurating ovarian cyst search should be made for a previous history of typhoid.

Castration in Osteomalacia.

Sternberg (*Wiener klin. Wochenschrift*, 1892, Nos. 44 and 45), from a study of eleven cases, draws the following conclusions: 1. If the patient's pelvis is so deformed that the birth of a living child, or the successful induction of abortion is impossible, castration should be performed; 2. If the patient is so near the menopause that conception is improbable, or is in such a poor condition that cœliotomy would be inadvisable, or the patient refuses operation, the phosphorus treatment may be used; 3. In all other cases, whether in young or old patients, the treatment with phosphorus is the best.

Kummer (*Revue Méd. de la Suisse Rom.*, 1892, No. 7) reports a successful case of oöphorectomy for osteomalacia (the first reported in Geneva) and refers to thirty-eight other cases that he had collected, in all of which the patient was cured by the operation.

The Organization of Hæmatocele.

Sänger (*Centralblatt für Gynäkologie*, 1893, No. 25) believes that the vast majority of cases of hæmatocele are from escape of blood from the Fallopian tube—usually tubal abortion. The position of the tube accordingly determines the site of the hæmatocele; the blood is more often found laterally than at the bottom of Douglas's pouch. Hæmatocele may be diffuse or isolated; in the first variety the blood-clot is found spread throughout the meshes of adhesions, while in the latter it forms a single tumor, which is only moderately adherent to the surrounding parts. The former is encapsulated by pseudo-membranes and is quickly absorbed, while the isolated tumor has a thick, hard capsule of old coagulum with softened interior, and can be readily enucleated like an adherent cyst. Surgeons have confounded these two varieties and have sup posed that they were removing a sac, when they were simply enucleating an isolated hæmatocele. A careful examination is often necessary to distinguish such a mass from a tubo-abdominal mole, pregnancy in the distal end of the tube, or an ovarian hæmatoma. When the blood is poured out slowly, coagulates from without inward, and an inflammatory process takes place in the surrounding tissues, a capsule of fibrin is formed, which is thickened by deposits of fibrin upon its inner surface. This remains stationary for three or four weeks, when it begins to be penetrated by new-formed vessels from neighboring organs. The capillaries penetrate to the interior of the mass and gradually liquefy and absorb it. The cavity in the centre collapses, its walls adhere, and the flattened mass is eventually transformed into a cicatricial nodule, months, or perhaps years, elapsing before the retrograde process is complete.

As regards the prognosis of a circumscribed hæmatocele, so long as the capsule is thin and fresh there is danger of secondary rupture, but if it has not increased in size at the end of two or three weeks, but preserves its rounded shape, it is safe to infer that its capsule is so firm that the tumor can be safely enucleated.

The writer advises cœliotomy for the removal of hæmatoma due to tubal abortion or rupture of an ectopic sac, in preference to vaginal incision, and reports eleven successful operations. Radical removal is preferable to simple ligation of the vessels, or tampon-drainage as recommended by Miculicz.

Bimanual Examination of the Posterior and Lateral Walls of the Pelvis.

Freund (*Centralblatt für Gynäkologie*, 1893, No. 25) affirms that the ligaments and muscles of the pelvis can be most readily palpated bimanually if the patient is examined in the erect posture, one hand exploring the vagina, while the other is passed over the buttocks.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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Water Filtration and Cholera.

Dr. Robert Koch, in an article on "Water Filtration and Cholera" (*Zeitschrift für Hygiene und Infectionskrankheiten*, July 7, 1893), gives a number of interesting facts in support of the drinking-water theory of transmission of cholera and typhoid fever—facts which the Pettenkofer school will find it difficult to explain. The recent experiences of Hamburg, Altona, and Wandsbeck have been instructive in the highest degree. These three cities, which are adjacent one to another, form practically one city, having all conditions in common with the exception of the water-supply. Wandsbeck is supplied with filtered water from a lake not exposed to pollution; Hamburg drew its water in an unfiltered condition from the Elbe at a point above the city, while Altona is supplied with filtered water taken from the river below the city. While Hamburg was frightfully stricken by cholera, Altona and Wandsbeck were almost free from it. Particularly interesting and impressive is the fact that the Hamburg supply was taken at a point where the contamination of the river was relatively slight, while the Altona supply, which was filtered before distribution, was taken at a point below the entrance of the sewage of nearly 800,000 people. Still more interesting is the experience of those living at the boundary line between the two cities. On one street, which for a long distance is the boundary, the Hamburg side was stricken, while the Altona side remained free. One group of houses on the Hamburg side was quite free from cholera, and it happens that they were supplied with water from Altona. Koch naturally attributes the comparative im-

munity of the city of Altona to the filtration. Out of about 500 cases, at least 400 could be set down as having originated in Hamburg or through some particular conditions. But the experience of the present year has taught that a filter bed of itself is not protection enough. The bed must be complete in every detail, and filtration must be most carefully conducted and with constant bacteriological control experiments. Investigation of outbreaks of typhoid fever at Altona had demonstrated a connection between the disease and imperfect filtration, and it had been noted that outbreaks occurred after every period of prolonged cold. In January and February of the present year cholera cases occurred all over the city. These could not be traced to Hamburg, as many of those seized had not been in Hamburg, others had not been out of their dwellings, and moreover there was no cholera in Hamburg at the time. A few cases which did occur in Hamburg were in one small district supplied with Altona water. From October 1, 1892, bacteriological examinations of the filtered water in the reservoir had been made almost daily. In the first week in December a rapid increase in the number of bacteria was observed; from December 30th the number began again to increase, and on January 12th reached 1516 per cubic centimetre, then fell for a time, but rose again during the last week of January to from 1200 to 1400. As it was evident that filtration was proceeding imperfectly, the different filter beds were examined, and it was found that they varied widely in efficiency; that cleansing of the filters was followed by a period of several days of inefficiency, and that renewal of the sand acted to still further diminish the efficiency for a still longer period. One of the beds (No. 8), which acted more imperfectly than the others, was found to be frozen at the surface, and this had for a time wholly prevented filtration, which after a time went on at places which became thawed. The object of sand filtration is to free the water from suspended matter; soluble matters pass through the filter wholly or nearly unchanged. The process is not maintained by the sand alone, for a layer of mud must form on the surface of the sand, and this layer is the true filtering medium. It must be uniform, and during filtration must not be disturbed. When it becomes so thick as to be permeable with difficulty, it must be removed. Different waters require varying lengths of time for the formation of this layer according to the amount of mineral and vegetable impurities present; thus, some waters rich in clayey matter deposit a good layer in eight to ten hours, while others containing chiefly vegetable impurities require at least twenty-four. At certain times in the year, particularly when the vegetable matter is largely increased in amount by the enormous development of algæ, the layer may in a few days become quite impermeable. It has been observed that for complete filtration the depth of the sand in a bed must not be less than 30 centimetres, and the rate of flow should not exceed 100 millimetres per hour. When anything occurs to interfere with perfect filtration, a change is at once observable in the character of the effluent. When acting properly, less than one hundred bacteria are found in a cubic centimetre of the effluent, regardless of the number present in the original water, whether they were to be counted by the hundred or by the hundred thousand. But the slightest disturbance of the proper conditions, as, for instance, acceleration of the rate or damage to the surface, causes an immediate increase in the number of

microbes. In well-filtered water the greater number of the microbes are derived from growths on the materials composing the lower part of the bed, and these organisms are harmless. A small number of microbes come undoubtedly from the original unfiltered water, for it is impossible to keep back absolutely every one.

Flies and the Spread of Cholera.

Dr. J. Sawtschenko (*Centralblatt für Bakteriologie und Parasitenkunde*, Band xii. p. 893) reports the results of a series of experiments conducted for the purpose of ascertaining the possible connection between flies and the spread of cholera. Ordinary house-flies and another kind were fed with pure cultures of cholera, and as late as four days after ingestion the bacilli could be detected in the bowel contents and in the excreta. Bacilli taken from the contents of the bowels three days after ingestion and introduced into guinea-pigs caused death about as quickly as would the pure cultures themselves. The results were the same when the flies were fed with the excreta of cholera patients instead of the pure cultures. Some of the results of feeding indicated that the bacilli probably multiply within the fly, so that the insect is not only a distributer, but a breeding-place for the bacillus.

U. Simmonds also (*Deutsche medizinische Wochenschrift*, 1892, No. 41) made experiments in this same line. He caught a fly in the autopsy-room at Hamburg when it was crowded with bodies of those who had died of cholera, and made a bacteriological examination, which demonstrated numerous cholera bacilli. In order to ascertain how long the cholera poison could remain active on flying insects, experiments were made, which showed that it remained virulent up to an hour and a half after drying, which is time enough for considerable distribution over long distances. The desirability of carefully covering all objects contaminated by cholera dejections and of covering all food against flies is plain. After the first experiment with the flies in the autopsy-room, the bodies were sewed up as quickly as possible and the tables well washed, and subsequent experiments were negative in results.

Cholera and Impure Water.

Dr. F. Regnault (*Médecine Moderne*, February 22, 1893) claims that the polluted water-supply of Marseilles must have been responsible in some degree for the last previous epidemic of cholera in that city. The water is derived from the river Durance by a conduit, which within four miles of the city receives a very large amount of pollution. The water passes through a densely populated district, serves as motive power for a number of mills and factories, including grain mills, in which, in addition, it is used for washing the grain which comes from Russia, India, and the Levant, where, instead of machinery being used for the purpose, it is trodden by human feet. Bacteriological examination of samples taken at different points showed an enormous increase in the number of bacteria per cubic centimetre. A part of the city is supplied with water from the river Huveaune, which receives the sewage of a number of villages, and is extremely rich in bacteria.

Cholera and Water-supply.

Dr. Rai Bahadur A. Mitra, chief medical officer, Kashmir (*The Indian Medical Record*, February 15, 1893), advocating the appointment of a cholera commission for the systematic investigation of the cholera question, directs attention to the importance of not considering the water-supply question to the exclusion of all others, and, in fact, goes further, and says that it should not be the first item in the budget of sanitation. He cites several instances mentioned by Surgeon-Colonel Hamilton of cholera breaking out under circumstances in which the water-supply could not be suspected. Cholera sometimes attacks the English barracks, while the filthy native bazaars close by with a filthy water-supply escape. The fall of cholera mortality in Calcutta came after the introduction of a supply of pure water, but with this new supply came at the same time drainage, improved sewerage, efficient conservancy, and improvement of filthy *bustees*. Mitra claims that if it depended on water alone, Calcutta ought to be free from cholera, whereas it is seldom absent at any time. Admitting that pure water is of great importance, he asserts with emphasis that decaying vegetable and animal matter, bad drainage, and overcrowding are as much responsible for cholera as bad drinking-water, and that the removal of fecal matter and efficient surface and subsoil drainage will reduce the chance of introducing cholera into a town to a minimum. In supplying pure water to the natives, it must be brought to the very door or they will not use it. Without drainage the subsoil water rises, the surface moisture increases, and the exact conditions favorable to cholera and typhoid increase. Dr. Mitra expresses the opinion that to improve the sanitary condition of a place, the removal and disposal of filth, the prevention of overcrowding, and drainage and roads are by no means of secondary importance; but that when the cholera seeds have germinated in filth, water stands pre-eminently the most convenient, ready, and easy distributing agent.

Experimental Eating of Cholera Bacilli.

Dr. Hasterlik (*Correspondenzblatt für Schweizer Aerzte*, April 1, 1893) has repeated on himself and three others Pettenkofer's experiment with cholera bacilli without injury. At first the experimenters took only small amounts of cholera cultures without result, then they took larger amounts, and one of them ate an entire culture of a third generation. In this case in thirty-six hours came pain in the bowels, tenesmus, and diarrhœa of no particular characteristics. In one other experiment, in which not a sign of sickness occurred, the cholera bacillus was found in the normal dejections.

Detection of Small Amounts of Cholera Germs in Large Amounts of Water.

Dr. Arens (*Münchener med. Wochenschrift*, March 7, 1893) has been experimenting with a view to finding a means which would provide the most favorable conditions for the growth of the cholera germs, and at the same time kill or at least hinder the growth of other bacteria. After a number of experiments he found such an agent in caustic potash. Experiments with

175 c.c. of water, 25 c.c. of pancreas bouillon, and varying amounts of 10 per cent. solution of caustic potash, showed that with increase in alkalinity to a point representing 0.30 per cent. of caustic potash, there was a diminution in the number of bacteria to sterility; but that with 0.05 to 0.08 per cent. the growth of the cholera germ was favored. By alkalizing to this extent specimens of water containing known amounts of cholera germs and pancreas bouillon, the cultures could be made and isolated when 5 c.c. of the water contained but two organisms, and under some conditions when containing only one.

Influence of Strongly Saline Water on the Development of Cholera Bacilli.

Dr. Aufrecht, of Magdeburg (*Centralblatt für Bakteriologie und Parasitenkunde*, March 23, 1893), reports that strongly saline water may favor the development of cholera bacilli. The river Elbe receives enormous amounts of salts from various chemical works, and on January 9th contained in 100,000 parts of water, 19.5 of lime, 8 of magnesia, and 179 of chlorine; at this time the water was unfit for use. To decide the question whether such water would favor the development of the cholera bacillus, Aufrecht inoculated cholera bacilli on—

1. Slightly alkaline nutrient gelatin.
2. Gelatin with 1 per cent. of soda.
3. Gelatin with one gramme of Elbe water concentrated to one-tenth.

The development of the organisms on No. 3 was as good as that on No. 2; in both cases being better than on No. 1.

Precautions against Cholera.

The Conference of Port Medical Officers of Health (*Sanitary Record*, January 1, 1893) resolved "that it is desirable, as a general principle, that medical inspection for the prevention of cholera should be kept up by day and by night without any intermission," decided to request the London Port Sanitary Authority to issue, as occasion arose, a list of infected ports for the guidance of all the port medical officers, and to approach the Local Government Board to ask for compulsory powers of detention of ships from suspected or infected ports, and that these ships should not be released till they had received a certificate from the port medical officer. It was agreed that all ships from infected or suspected ports should be treated as infected until found to be otherwise.

Quarantine was defined as the detention of a healthy ship, and it was resolved unanimously, "that in the opinion of this conference, quarantine or the detention of a vessel having no sickness on board, and so certified by the medical officer of health, is unjustifiable." Though disapproving of quarantine, the practice of taking the names and addresses of passengers and crews was approved.

Resolutions were passed requiring lodging-house keepers to keep a register containing the particulars regarding sailors and others coming from infected or suspected ports, and that sanitary authorities ought to provide forthwith proper and special hospital accommodation for the treatment and isolation of

cholera cases. Objection was made to floating hospitals, as these could be placed only on smooth water of a river which might easily become contaminated by the patients.

Report of the "Lancet" Special Commission on the Water-supply of Chicago.

The report of the *Lancet* special commission on the Chicago water-supply is, in general, very favorable. In spite of the dumping process—that is, the discharge of sludge dredged up from the beds of the river—into Lake Michigan, chemical analysis fails to furnish any distinct evidence that the lake is seriously polluted. Water taken from the lake over the dumping grounds was of a quality, save for its suspended matter, superior to that of the ordinary London water-supply—that is to say, the percentage of dissolved matter of organic origin was less than in the London waters, and as the suspended matter could all be removed by effective filtration, it is plain that even at this point the lake, under favorable conditions, will supply water which wants nothing but the most ordinary treatment to render it fit for any and every domestic purpose. Unfiltered this water is quite unfit for drinking by reason of its suspended matter; hence the security of Chicago against a serious outbreak of epidemic disease depends entirely on the care with which the water is purified before use by domestic filters. The filtered water examined by the *Lancet's* chemists had in both cases been cooled by the admixture of polluted ice, which manifestly renders the filtration futile. The results of chemical analysis lead to the conclusion that the clear or filtered lake water is comparatively pure. It is of excellent quality and well adapted for both dietetic and other ordinary purposes. In respect of organic purity, the water of Lake Michigan contrasts very favorably with the water supplied to London.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Immunity: Evidence of the Correctness of the "Antitoxin Theory" Deducible from the Specific Treatment of Tetanus.

We have seen that the most perfect degree of immunity and the most suggestive line of proof of the agency of antitoxins in its establishment has been developed in the study of tetanus; it is also the disease in which the facts of immunity experimentally educed were first put to therapeutic test.

It is neither strange, nor does it greatly militate against the correctness of the theory under discussion, that at first these therapeutic tests should have

been unsuccessful. Caution was necessary in the employment of a substance so powerful as the antitoxin of tetanus, and the effect of the injection of large quantities of the blood serum of immunized animals had not then been determined.

It will be remembered that the first experimentally induced immunity to tetanus was obtained by Behring and Kitasato. They established the immunizing action of the blood serum of their immune animals when introduced into susceptible animals, and it was suggested that a curative effect might similarly be obtained in cases of human tetanus. The opportunity to test this soon presented itself, and the result of the experiment was reported to the Berlin Medical Society, February 4, 1891, by A. BAGINSKY (*Berliner klinische Wochenschrift*, 1891, No. 7, 176). A well-developed child, nine days old, suffered from a very pronounced case of trismus and tetanus neonatorum as the result of infection through the navel. Having never seen any benefit to result from the ordinary medicinal treatment in such cases, Baginsky invited Kitasato to see the case and to direct treatment with the blood serum of immune animals. The diagnosis was confirmed by the detection of tetanus bacilli in the pus of the inflamed navel, and their virulence was shown by animal inoculations. The child received in three days six injections of the blood serum of an immune rabbit, aggregating 1.5 c.c., but without appreciable effect upon the course of the disease. It was, however, shown that such injections were quite devoid of danger, and it was suggested that larger doses might prove more efficacious in a subsequent case.

Soon after Baginsky's experiment in Berlin a notable series of tests of the therapeutic value of the antitoxin of Tizzoni and Cattani began in Northern Italy, the majority of them under the eye of Prof. Tizzoni himself. The first of these, reported by GAGLIARDI, but not until nearly a year after its occurrence (*La Riforma Medica*, 1892, No. 76; *Centralblatt für Bakteriologie und Parasitenkunde*, 1892, xii. 115), was made in the case of a robust laborer, forty-five years of age, who cut his left foot while working in the field. Twelve days after the injury symptoms of tetanus made their appearance, and a well-marked and unmistakable type of the disease was quickly developed. Four injections in five days, of twenty-five centigrammes each, of the antitoxin of Tizzoni brought about complete subsidence of all the symptoms.

The second case, published in fact before that of Gagliardi, is recorded by SCHWARZ (*Centralblatt für Bakteriologie und Parasitenkunde*, 1891, x. No. 24, 785). The patient, a previously healthy boy, fifteen years of age, cut his left arm in the region of the elbow with a dirty knife, which he was using to cut a nut which he had picked up from the ground. The wound healed without other complication at first than secondary hemorrhage. But two weeks after the accident he was taken to the hospital in Padua suffering from occasional spasms, at first confined to the left arm, but later becoming general, and associated with trismus, which in a few days made it impossible for him to move his jaw. There could be no doubt as to the nature of his trouble, especially as examination of the earth with which the knife had been soiled showed the presence of the tetanus bacillus both by culture and by animal inoculation.

Treatment with chloral, warm baths, and injections of carbolic acid,

according to Bacelli's method, having proved ineffectual, a preparation of the tetanus antitoxin was obtained from Prof. Tizzoni. The first injection of fifteen centigrammes was followed by temporary fall of temperature, sweating, and some amelioration of the spastic condition. More lasting benefit followed a second injection of a like amount on the following morning, and in the afternoon of the following day the dose was increased to twenty-five centigrammes, with noticeable improvement on the following morning (fourth of the treatment) as the result, the spasm of all the muscles being much lessened, so that the patient could walk, though unsteadily. In the afternoon another injection of twenty-five centigrammes was given, and on the following morning the patient was able for the first time to open his mouth and masticate solid food. The spastic condition of the muscles had disappeared and appetite began to return. The improvement in the patient's general condition was now rapid and uninterrupted, the only symptom remaining on the sixth day of the treatment being slight weakness of the muscles.

The third, and in point of severity the most remarkable case of traumatic tetanus cured by antitoxin treatment is reported by PACINI (*La Riforma Medica*, 1892, No. 4; *Centralblatt für Bakteriologie und Parasitenkunde*, 1892, xi. 423). A man, twenty-one years old, wounded his finger in cutting feed in a barn where oxen, rabbits, and a goat were kept. The cut healed. Ten days later inability to move the jaw as freely as usual was noticed. This increased, and was followed by rigidity of many of the muscles, compelling him to apply for relief at the hospital on the nineteenth day after the accident. The diagnosis of tetanus traumaticus was easily made, and the chloral treatment was instituted, but without benefit, the convulsions increasing till their number reached *eighty-five* on the twenty-fifth day after the injury. On that day the patient received two injections of twenty-five centigrammes each of Tizzoni's antitoxin, prepared from the blood of an immune dog. Similar injections were given twice daily until seven doses had been given, when such marked improvement had resulted that they were discontinued, the patient making a good recovery with the aid of occasional doses of chloral. As during the exhibition of the antitoxin no other medication was used, and each dose was followed by distinct amelioration of the symptoms, there seems to be no room for reasonable doubt of the curative effect of the antitoxin.

The fourth of these remarkable cases is reported by FINOTTI (*Wiener klinische Wochenschrift*, 1892, No. 1) from the surgical clinic of Prof. Nicoladoni in Innsbruck. The patient was a boy, eleven years old, whose hand was crushed in a threshing machine. Notwithstanding amputation, in eight days trismus began to develop, and was followed by general muscular rigidity and convulsions. The antitoxin treatment was ordered by telegraph from Prof. Tizzoni, and on the eleventh day after the injury the injections were commenced and were continued daily for two weeks, the doses varying from 15 cgm. to 25 cgm. These were followed, as in the other cases, by fall of temperature, sweating, and amelioration of the tetanic symptoms until recovery was complete.

The fifth case is reported by TIZZONI himself (*La Riforma Med.*, 1892, No. 160; *Centralbl. f. Bakt. u. Parasit.*, 1892, xii. 801). A lacerated wound of the middle finger was soiled with dirt. Twelve days later symptoms of

tetanus began to develop and increased to such an extent that Tizzoni ordered amputation of the finger to prevent further absorption of the poison and at the same time began treatment with the blood serum of an immune rabbit. Sixteen injections of from 2½ to 5 c.c. blood serum, 40 c.c. in all, were given, and six injections, aggregating 1.35 grammes, of antitoxin prepared from the blood of an immune rabit. The recovery was perfect.

The previous cases had been treated with antitoxin obtained from the blood of immune dogs. Tizzoni argues from his success in this case that the blood serum of the rabbit, and the antitoxin prepared from it, are equally efficacious with those prepared from immune dogs.

TARUFFI (*Centralblatt für Bakteriologie und Parasitenkunde*, 1892, xi., No. 20, 625) reports a sixth case. A peasant, seventy-four years old, inflicted a bad lacerated and contused wound of the little finger of the right hand. The wound was not dressed, and suppurated. On the tenth day symptoms of tetanus developed. These rapidly increased in severity and two days later Prof. Tizzoni visited the case and the first injection (25 cgm.) of the antitoxin was given. This was followed by decided improvement, the patient becoming more quiet, the temperature falling, perspiration being abundant, and an increased elimination of urine being noted. Notwithstanding the marked improvement it was thought best to amputate the wounded finger. Virulent tetanus bacilli were cultivated by Prof. Tizzoni from the wound. The symptoms gradually passed away under the influence of repeated injections of the antitoxin, aggregating 150 cgm. in less than four days, until on the eleventh day after commencing the treatment the patient was well.

Interesting features of this case are the proof of the toxicity of the urine before the antitoxin treatment and the disappearance of this feature on the third day of the treatment, and the failure of the blood serum of the patient to induce symptoms of tetanus in a rat on the second day of the treatment, both of these observations directly pointing to a neutralizing power on the part of the antitoxin as regards the toxins of the disease.

An interesting feature of the seventh case is the evidence offered by it of the curative power of the antitoxin when tetanus and septicæmia are associated. This case, recorded by CASALI (*Centralblatt für Bakteriologie und Parasitenkunde*, 1892, xii., Nos. 2 and 3, p. 56), occurred in a woman, twenty-two years of age, whose foot was injured while at work in the field. She thought little of it, continued her work, barefooted, during the whole day, and walked home two miles in the evening. The next day the foot was so sore as to prevent her walking, and she was seen by Casali, who dressed the wound and ordered complete rest in bed. This order was disobeyed, and suppuration set in in a few days, and a little later swelling of the glands in the groin, fever, and prostration gave signs of septic intoxication. Two weeks after the accident symptoms of tetanus were superadded, and cultures made by Prof. Tizzoni from the pus of the wound demonstrated the presence of the tetanus bacillus in association with the *streptococcus septicus*. The antiseptic treatment of the wound was more energetically carried out and the antitoxin treatment was at once begun. The symptoms gradually improved, those of septic intoxication considerably outlasting the symptoms of tetanus which entirely disappeared after the sixth injection of the antitoxin.

The association of tetanus and septic intoxication in this case seems

unquestionable. In view of this the rapid subsidence of the symptoms of the former disease under the antitoxin treatment while the septic symptoms continued is of the greatest interest, as bearing out the idea of the specific curative effect of the tetanus antitoxin, and also shows that this effect is not seriously impaired by the presence of other toxins than those of the tetanus bacillus. For these reasons this case appears to us to offer the most conclusive proof of the correctness of the antitoxin theory of immunity which has yet been afforded by therapeutic experiment.

The eighth case of cure of traumatic tetanus by means of the antitoxin treatment is reported by FINOTTI (*La Riforma Med.*, 1892, No. 148; *Centralbl. f. Bakt. u. Parasit.*, 1892, xii. 801), who, it will be remembered, had already recorded the fourth. In this case the tetanic symptoms followed a compound fracture of the left forearm. The tetanus antitoxin was the only treatment employed, 480 cgm. of the antitoxin being given in twenty-three injections. Recovery was perfect.

Early in 1892, two cases of traumatic tetanus were treated in the Hôpital Necker in Paris, by Vaillard and Roux, by means of subcutaneous injections of the defibrinated blood of immune rabbits, but without benefit. These cases are reported by RÉNON (*Annales de l'Institut Pasteur*, 1892, No. 4, 233). The first, a laborer, twenty-nine years old, received in all 57 c.c.; the second, a fifty-seven year old laborer, received 80 c.c. In the latter case the blood had been proved to have a marked antitoxic effect upon mice. Both patients died, though temporary improvement is said in each case to have followed the injections. It seems probable, in view of the experiments of Behring and Tizzoni, that the amount of antitoxin contained in the doses of blood employed was too small to be followed by more than the temporary improvement recorded.

BEHRING, who has been one of the most ardent workers in the field of immunity from the first, has devoted the second part of his recent work upon the "Blood-serum Therapy" (*Die Blutserumtherapie.* II. *Das Tetanusheilserum und seine Anwendung auf Tetanuskranke Menschen.* Leipzig: G. Thieme, 1892) to the discussion of the curative value to man of the serum of animals immune to tetanus. In this he most convincingly champions the cause of the new therapy and states it as his belief that the early exhibition of the treatment (within thirty-six hours after the onset of symptoms) would reduce the mortality of traumatic tetanus from 85 per cent., or thereabouts, to less than 35 per cent. His experiments lead him to the same conclusion reached by Tizzoni regarding the identity of the antitoxin of tetanus in all cases, whether obtained from the blood of dog, rabbit, or horse.

In the same publication, the history of a case of tetanus is reported by ROTTER (also in *Deutsche med. Woch.*, 1893, No. 7, 152), in which five injections of the serum of an immune horse, on five successive days, brought about speedy subsidence of the symptoms. In all, 261 grammes of the serum were injected. As the case was of undoubted nature and of much severity, its favorable outcome is looked upon by Behring as decided evidence of the value of the "blood-serum therapy."

The beneficial effect of similar treatment of sheep and horses suffering from tetanus is further reported by BEHRING and CASPER.

In a recent paper by ROUX and VAILLARD (*Annales de l'Institut Pasteur*,

1893, No. 2, 65) seven cases are reported in which the therapeutic value of the blood serum of immune animals was tested. As recovery occurred in only two of them, it may be well to consider some of their features.

In all of the fatal cases the course of the disease was unusually rapid, the longest of them lasting only six days, the shortest two days. The treatment was not begun until relatively late, in two cases not until the fourth day of the disease, and in none before thirty-six hours had elapsed. Furthermore, the dosage was small considering the severity of the cases; in only one can it be said to have been at all adequate, and, as it happens, this was the case which survived the longest—two and a half days after the beginning of the injections.

The two successful cases were of much longer duration and slower progress, and the treatment was begun in them relatively early in the course of the disease. The dosage, too, was larger than in the fatal cases, and improvement set in almost immediately after the exhibition of the treatment.

Notwithstanding their poor success with the treatment, Roux and Vaillard advocate its employment at the earliest possible date after the onset of symptoms, making use of not less than 100 c.c. of blood serum of the highest possible immunizing power at each dose, the dose to be repeated twice daily if necessary. Used in this way they believe that much is to be hoped from the treatment, especially when associated with thorough antiseptic care of the wound, if possible with excision of the surrounding tissue.

We have thus accumulated nineteen cases of traumatic tetanus which have been treated in accord with a theory having for its basis facts obtained from animal experiments. Eleven of these have resulted in recovery, and the beginning of improvement has in all followed immediately upon the commencement of the treatment. Since the mortality of tetanus is about 85 per cent. of all cases of the disease, and since in the unsuccessful cases there is reason to criticise the smallness of the dosage and the late commencement of the treatment, we cannot but feel that the results of the treatment afford striking corroboration of the theory upon which the treatment is based.

We shall see in a subsequent number that similar, though perhaps less convincing, results have attended the similar treatment of pneumonia.

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